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NOTE: Separate personal and corporate author indexes are provided in this issue
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10-6115 10-6116 10-6117
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10-7219 10-7220 10-7221
10-7222 10-7229 10-7279
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10-7374 10-7375 10-7873
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10-8783 10-8832 10-8833
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10-9231 10-9519 10-9617
10-9639 10-9649 10-9759
10-9760 10-9761 10-9893
10-10060 10-10304 10-10598
10-10599 10-10600 10-10757
10-10777 10-10826 10-10981
10-10982 10-11537 10-11538
10-11602 10-11608

CALIFORNIA. UNIV., BERKELEY. SANITARY ENGINEERING RESEARCH LAB.
10-1327

CALIFORNIA. UNIV., LIVERMORE. RADIATION LAB.
10-236 10-382 10-893
10-910 10-928 10-943
10-1412 10-1853 10-1872
10-2173 10-3137 10-3221
10-3225 10-3236 10-3287
10-4066 10-4109 10-4740
10-4856 10-5778 10-6062
10-7813 10-9420 10-10255
10-10256 10-10257 10-10258
10-10259 10-10601 10-11042

CALIFORNIA. UNIV., LOS ANGELES.
10-573 10-574 10-778
10-3044 10-3202

CALIFORNIA. UNIV., LOS ANGELES. ATOMIC ENERGY PROJECT
10-2 10-507 10-508
10-509 10-517 10-554
10-555 10-581 10-956
10-2671 10-2967 10-2973
10-2993 10-3184 10-3328
10-3351 10-3770 10-3776
10-3834 10-3881 10-3901
10-3969 10-3997 10-4518
10-5085 10-5086 10-5087
10-5088 10-6103 10-6463
10-7290 10-7381 10-7382
10-7448 10-9033 10-9103

CALIFORNIA. UNIV., LOS ANGELES. SCHOOL OF MEDICINE.
10-956 10-1153 10-1329
10-1693 10-6463

CALIFORNIA. UNIV., SAN FRANCISCO. SCHOOL OF MEDICINE. RADIOLOGICAL LAB
10-3166

CALLERY CHEMICAL CO., PENNA.
10-60 10-232 10-1210
10-1211 10-1212 10-2611
10-2612 10-4532 10-4584
10-6518 10-6519 10-7463
10-10056 10-10128 10-10384
10-11686 10-11687 10-11688

CAMBRIDGE RESEARCH CENTER. ATOMOSPHERIC PHYSICS LAB., BEDFORD, MASS.
10-11880

CAMBRIDGE UNIV., ENGLAND.
10-7696

CANADA. DEPT. OF MINES AND TECHNICAL SURVEYS.
10-8172

CANADA. DEPT. OF MINES AND TECHNICAL SURVEYS. MINES BRANCH.
10-795 10-1465 10-7666
10-7706 10-8173 10-8174
10-8175 10-8176 10-8177
10-8178 10-8179 10-11952

CARBIDE & CARBON CHEMICALS CO., Y-12 AREA, OAK RIDGE, TENN.
10-4140

CARBIDE AND CARBON CHEMICALS CORP. K-25 PLANT, OAK RIDGE, TENN.
10-242 10-1213 10-1490
10-1703 10-1994 10-2105
10-2340 10-2401 10-2404
10-2484 10-2682 10-2975
10-3099 10-3123 10-3181
10-3346 10-3411 10-3442
10-3443 10-3464 10-3476
10-3491 10-3497 10-3554
10-3555 10-3556 10-3557
10-3577 10-3578 10-3579
10-3586 10-3597 10-3638
10-3639 10-3763 10-3796
10-4181 10-4182 10-4183
10-4215 10-4236 10-4237
10-4256 10-5108 10-5152
10-5212 10-5213 10-5305
10-5326 10-6100 10-6107
10-6126 10-6177 10-6178
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10-6236 10-6253 10-6262
10-6318 10-6319 10-6320
10-6341 10-6441 10-7129
10-7198 10-7303 10-8766
10-8782 10-8805 10-8826
10-9014 10-9282 10-10054
10-10705 10-10767 10-10792
10-11730

CARBIDE AND CARBON CHEMICALS CORP., OAK RIDGE, TENN.
10-2046 10-4265 10-4468
10-5131 10-5301 10-6261
10-6315

CARBIDE AND CARBON CHEMICALS CORP., SUBSTITUTE ALLOY MATERIALS LABS., N. Y.
10-2370 10-2371 10-4213
10-5197

CARBIDE AND CARBON CHEMICALS CORP. Y-12 PLANT, OAK RIDGE, TENN.
10-615 10-2267 10-2268
10-2276 10-2335 10-2336
10-2337 10-2455 10-2460
10-2470 10-2473 10-2474
10-2475 10-2477 10-2478
10-2479 10-2570 10-2736
10-2994 10-2995 10-2996
10-3016 10-3135 10-3182
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10-3533 10-3567 10-3568
10-3569 10-3570 10-3571
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10-6328 10-6333 10-7116
10-7231 10-7232 10-7233
10-8835 10-8836 10-8837
10-9828 10-10779 10-10892
10-10893 10-10895

CARBIDE & CARBON CHEMICALS DIV., K-25 PLANT, OAK RIDGE, TENN.
10-4238 10-4239 10-4338
10-6331 10-7138 10-7360
10-9772

CARNEGIE INST. OF TECH., PITTSBURGH.
10-1395 10-1601 10-1814
10-1840 10-1944 10-2076
10-3415 10-3470 10-5814
10-5886 10-7708 10-11339
10-11345 10-11524

CARNEGIE INST. OF TECH., PITTSBURGH. METALS RESEARCH LAB.
10-2988 10-5157 10-6706
10-7780 10-11840

CASE INST. OF TECH., CLEVELAND.
10-1373 10-1396 10-1805
10-1821 10-2078 10-2723
10-3153 10-3280 10-3281
10-4621 10-4675 10-5677
10-6682 10-10200 10-11177

CASE INST. OF TECH., CLEVELAND. NUCLEAR PHYSICS LAB.
10-2964

CATALYTIC CONSTRUCTION CO., PHILADELPHIA.
10-3000

CHEMICAL AND RADIOLOGICAL LABS., ARMY CHEMICAL CENTER, MD.
10-7866 10-7867 10-9647

CHEMICAL CORPS MEDICAL LABS., ARMY CHEMICAL CENTER, MD.
10-547

CHEMICAL CORPS SCHOOL, ARMY CHEMICAL CENTER, MD.
10-954

CHEMICAL WARFARE LABS., ARMY CHEMICAL CENTER, MD.
10-5499 10-9987 10-10016
10-10017 10-10382

CHICAGO OPERATIONS OFFICE, AEC.
10-3943

CHICAGO, UNIV.
10-6394 10-6647 10-6648
10-11690

CHICAGO, UNIV. AIR FORCE RADIATION LAB.
10-536 10-5448 10-6489
10-7388 10-9037 10-9038

CHICAGO, UNIV. ENRICO FERMI INST. FOR NUCLEAR STUDIES.
10-8164 10-8332

CHICAGO, UNIV. INST. FOR THE STUDY OF METALS.
10-9337

CHICAGO, UNIV. METALLURGICAL LAB.
10-2346 10-2397 10-2441
10-2456 10-2464 10-2486
10-2487 10-2522 10-2548
10-2563 10-3127 10-3402
10-3416 10-3428 10-3430
10-3471 10-3480 10-3502
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10-3593 10-3608 10-3618
10-3636 10-3646 10-3647
10-3658 10-3680 10-3681
10-3682 10-3683 10-3684
10-3685 10-3707 10-3708
10-3709 10-3710 10-3711
10-3712 10-3713 10-3714
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10-9736 10-9756 10-9762
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10-10019 10-10733 10-10764
10-10784 10-10811 10-10884
10-10923 10-10947 10-10948
10-10983 10-11775

CINCINNATI UNIV.
10-780

CINCINNATI, UNIV. APPLIED SCIENCE RESEARCH LAB.
10-10008

CLARK UNIV., WORCESTER, MASS.
10-6527

CLEVITE RESEARCH CENTER, CLEVELAND.
10-10190

CLIMAX MOLYBDENUM CO. OF MICHIGAN, DETROIT.
10-827 10-863 10-865
10-2083 10-6698 10-11831

CLINTON ENGINEER WORKS, OAK RIDGE, TENN.
10-4217

CLINTON LABS., OAK RIDGE, TENN.
10-1288 10-2244 10-2285
10-2331 10-2541 10-2543
10-2972 10-3230 10-3434
10-3483 10-3585 10-3641
10-3659 10-3661 10-3673
10-3686 10-3726 10-3727
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10-3873 10-4122 10-4154
10-4171 10-4172 10-4173
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10-5182 10-5184 10-5224
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10-5331 10-5338 10-5339
10-5371 10-5383 10-5385
10-5386 10-5387 10-5388
10-5390 10-5391 10-5392
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10-5417 10-5437 10-6110
10-6150 10-6171 10-6172
10-6174 10-6188 10-6189
10-6190 10-6245 10-6271
10-6351 10-6414 10-6416
10-6417 10-6418 10-6419
10-6425 10-6450 10-6452
10-7240 10-7312 10-7338
10-7341 10-7358 10-7361
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10-8951 10-8952 10-8953
10-8991 10-8994 10-9730
10-9888 10-9889 10-9891
10-10781 10-10913 10-10970
10-11328

CLINTON NATIONAL LAB., OAK RIDGE, TENN.
10-2380 10-2490 10-3490
10-4126 10-4174 10-4291
10-4332 10-4408 10-5337
10-6345

COLUMBIA UNIV., IRVINGTON-ON-HUDSON, N. Y. NEVIS CYCLOTRON LABS.
10-3032 10-8023

COLUMBIA UNIV., NEW YORK.
10-150 10-515 10-1358
10-1785 10-2356 10-2363
10-3187 10-3354 10-3601
10-3668 10-3669 10-3670
10-3757 10-4204 10-5345
10-5432 10-7369 10-7370
10-7504 10-10724

COLUMBIA UNIV., NEW YORK. COLUMBIA RADIATION LAB.
10-5740 10-6924 10-7831
10-8514 10-8735

COLUMBIA UNIV., NEW YORK. DIV. OF WAR RESEARCH.
10-2249 10-2342 10-2358
10-2359 10-2362 10-2471
10-3420 10-3421 10-3462
10-3498 10-3516 10-4134
10-4225 10-5251 10-8231
10-8521

COLUMBIA UNIV., NEW YORK. ELECTRONICS RESEARCH LABS.
10-7833 10-8526

COLUMBIA UNIV., NEW YORK. LAMONT GEOLOGICAL OBSERVATORY.
10-11188

COLUMBIA UNIV., NEW YORK. MINERAL BENEFICIATION LAB.
10-1300 10-1301

COLUMBIA UNIV., NEW YORK. NUCLEAR PHYSICS LABS.
10-3852

COLUMBIA UNIV., NEW YORK. PUPIN PHYSICS LABS.
10-4340 10-5302 10-5322
10-10992

COLUMBIA UNIV., NEW YORK. RADIOLOGICAL RESEARCH LAB.
10-516

COLUMBIA UNIV., NEW YORK. SCHOOL OF ENGINEERING.
10-4694 10-6641

COLUMBIA UNIV., NEW YORK. SCHOOL OF MINES.
10-578 10-867 10-6275

COMBUSTION ENGINEERING, INC., NEW YORK.
10-2163

CONNECTICUT HARD RUBBER CO., NEW HAVEN.
10-10145

CONNECTICUT, UNIV., STORRS.
10-131 10-762 10-3159

CONSOLIDATED VULTEE AIRCRAFT CORP., FORT WORTH, TEX.
10-950 10-951 10-1101
10-1464 10-1858

CONSULTING LABS., SCHENECTADY, N. Y.
10-3621

CONTINENTAL OIL CO. CENTRAL RESEARCH LABS., PONCA CITY, OKLA.
10-4609

CONTINENTAL OIL CO., PONCA CITY, OKLA.
10-7615

CONVAIR, FORT WORTH, TEX.
10-2895 10-4542 10-5823
10-6030 10-6492 10-7080
10-10289 10-10527 10-12084
10-12115

CORNELL AERONAUTICAL LAB., INC., BUFFALO.
10-142 10-835 10-852
10-1116 10-1117 10-1216
10-4604 10-4648 10-4649
10-4650 10-6693 10-7699
10-8354 10-8413

CORNELL UNIV., ITHACA, N. Y.
10-3270 10-4763 10-5550
10-11961

CRANE CO., CHICAGO.
10-7732

CRUCIBLE STEEL CO. OF AMERICA, RESEARCH AND DEV. LAB., PITTSBURGH.
10-8417

DAVID SARNOFF RESEARCH CENTER, PRINCETON, N. J.
10-7827

DAVID W. TAYLOR MODEL BASIN, APPLIED MATHEMATICS LAB., CARDEROCK, MD.
10-8527 10-11340

DAVID W. TAYLOR MODEL BASIN, CARDEROCK, MD.
10-4691

DELAWARE, UNIV., NEWARK.
10-1724 10-4597 10-4598
10-5598 10-9118 10-11146

DENVER, UNIV. DENVER RESEARCH INST.
10-1333 10-5614 10-6619
10-8342 10-11839

DEPARTMENT OF COMMERCE, WASHINGTON, D. C.
10-9039

DETROIT CONTROLS CORP., REDWOOD CITY, CALIF.
10-1859

DETROIT UNIV.
10-221

DIVISION OF BIOLOGY AND MEDICINE, CIVIL DEFENSE LIAISON BRANCH, AEC.
10-5472

DIVISION OF BIOLOGY AND MEDICINE, RADIATION INSTRUMENTS BRANCH, AEC.
10-2467

DIVISION OF CIVILIAN APPLICATION, AEC.
10-4911

DIVISION OF CONSTRUCTION AND SUPPLY, AEC.
10-6711

DIVISION OF ENGINEERING, AEC.
10-2054

DIVISION OF ORGANIZATION & PERSONNEL, SAFETY & FIRE PROTECTION BR, AEC.
10-9967 10-11844

DIVISION OF RAW MATERIALS, AEC.
10-148 10-1784 10-4037

DIVISION OF RAW MATERIALS, DENVER EXPLORATION BRANCH, AEC.
10-801 10-1352

DIVISION OF RAW MATERIALS, SALT LAKE EXPLORATION BRANCH, AEC.
10-802 10-803 10-1353
10-1354 10-1355 10-4630

DIVISION OF REACTOR DEVELOPMENT, AEC.
10-1563 10-2163 10-2610
10-7429 10-8340 10-10068

DIVISION OF REACTOR DEVELOPMENT, NAVAL REACTORS BRANCH, AEC.
10-1868 10-3318

DIVISION OF SOURCE AND SPECIAL NUCLEAR MATERIALS ACCOUNTABILITY, AEC. 10-3029
DOW CHEMICAL CO. GREAT WESTERN DIV., PITTSBURG, CALIF. 10-702 10-703
DOW CHEMICAL CO. MAGNESIUM LABS. MIDLAND, MICH. 10-8422
DOW CHEMICAL CO. METALLURGICAL LABS., MIDLAND, MICH. 10-5649
DOW CHEMICAL CO., MIDLAND, MICH. 10-7729 10-8424
DOW CHEMICAL CO. ROCKY FLATS PLANT, DENVER. 10-3290 10-4016 10-4754 10-4793 10-8286
DOW CHEMICAL CO. WESTERN DIV., PITTSBURG, CALIF. 10-566 10-676 10-677 10-678 10-679 10-680 10-681 10-682 10-683 10-684 10-685 10-686 10-687 10-688 10-689 10-690 10-691 10-692 10-693 10-694 10-695 10-696 10-697 10-698 10-699 10-700 10-701 10-704 10-705 10-706 10-707 10-708 10-709 10-710 10-711 10-712 10-713 10-714 10-715 10-716 10-717 10-745 10-1287 10-1289 10-2044 10-2662 10-2749 10-3112 10-3122 10-3180 10-4025 10-6592 10-8803 10-10085
DOW CHEMICAL-DETROIT EDISON NUCLEAR POWER DEVELOPMENT PROJECT, DETROIT. 10-5272
DOW CORNING CORP., MIDLAND, MICH. 10-2020
DRIVER HARRIS CO., HARRISON, N. J. 10-1379
DU PONT DE NEMOURS E. I. AND CO. ENGINEERING DEPT., WILMINGTON, DEL. 10-3468 10-3524 10-6137 10-10736
DU PONT DE NEMOURS E. I. & CO. EXPERIMENTAL STATION, WILMINGTON, DEL. 10-2704
DU PONT DE NEMOURS E. I. AND CO. JACKSON LAB., WILMINGTON, DEL. 10-2309 10-2311 10-2312 10-2313 10-2325 10-2361 10-3423 10-3465 10-3466 10-3511 10-3514 10-3520 10-3521 10-3522 10-3560 10-5116 10-5129 10-5130 10-5132 10-5133 10-5217 10-5218 10-5225 10-6142 10-6238 10-6240 10-7161 10-7199 10-8829 10-8830
DU PONT DE NEMOURS E. I. & CO., MORGANTOWN ORD. WORKS, MORGANTOWN, W. VA. 10-5127
DU PONT DE NEMOURS E. I. & CO. PIGMENTS DEPT., WILMINGTON, DEL. 10-2250 10-2251
DU PONT DE NEMOURS E. I. & CO. SAVANNAH RIVER LAB., AUGUSTA, GA. 10-1235 10-2536 10-3142 10-3331 10-3377 10-3435 10-3436 10-3906 10-3938 10-4012 10-4062 10-4784 10-5609 10-6175 10-6593 10-6824 10-6852 10-6981 10-7561 10-8211 10-8329 10-8592 10-8917 10-9196 10-10129 10-11344
DU PONT DE NEMOURS E. I. AND CO. TNX DIV. WILMINGTON, DEL. 10-3030
DU PONT DE NEMOURS E. I. AND CO., WILMINGTON, DEL. 10-3467 10-3523 10-3752 10-4151
DUGWAY PROVING GROUND, TOOELE, UTAH. 10-4778 10-6544
DUKE UNIV., DURHAM, N. C. 10-580 10-6020 10-7781
DUMONT, ALLEN B. LABS, INC., TUBE RESEARCH LABS., PASSAIC, N. J. 10-3021
DUQUESNE UNIV., PITTSBURGH. 10-1212

EL-TRONICS, INC., PHILADELPHIA. 10-7871
ELECTRO METALLURGICAL CO., NIAGARA FALLS, N. Y. 10-5436
ENGINEER RESEARCH AND DEVELOPMENT LABS., FORT BELVOIR, VA. 10-1563
ESSO RESEARCH AND ENGINEERING CO., LINDEN, N. J. 10-5128
EUROPEAN COUNCIL FOR NUCLEAR RESEARCH, GENEVA. 10-1458
EUROPEAN COUN. FOR NUCLEAR RES., GENEVA. PROTON SYNCHROTRON GROUP. 10-5998 10-8012
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, GENEVA. 10-201 10-233 10-407 10-408 10-409 10-922 10-2179 10-6457 10-7012 10-10597
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH, GENEVA. PROTON SYNCHROTRON GP. 10-1076 10-1077 10-1078 10-1935
EVANS SIGNAL LAB., BELMAR, N. J. 10-953 10-6862 10-9462

FAIRCHILD ENGINE AND AIRPLANE CORP. NEPA DIV., OAK RIDGE, TENN. 10-4617
FANSTEEL METALLURGICAL CORP., NORTH CHICAGO, ILL. 10-8359
FERGUSON H. K. CO., INC., NEW YORK. 10-4115 10-6294 10-6400
FERGUSON H. K. CO., NEW YORK. 10-5350 10-7339 10-7340 10-9009 10-10969
FIRTH STERLING, INC., PITTSBURGH. 10-9276
FLORIDA, UNIV., GAINESVILLE. 10-7397 10-8238 10-10048
FOOTE MINERAL CO., PHILADELPHIA. 10-1215 10-8815 10-8900 10-8901
FRANCE, COMMISSARIAT A L ENERGIE ATOMIQUE, PARIS. 10-4505 10-4533 10-4628 10-4629 10-4781 10-4782 10-4783 10-4921 10-4959 10-5820 10-8328 10-8532 10-9211 10-9455 10-9458 10-9599
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10-10703 10-10798 10-10799

MALLORY P. R. AND CO., INC. METALLURGICAL RESEARCH LAB., INDIANAPOLIS.
10-10204

MALLORY-SHARON TITANIUM CORP., NILES, OHIO.
10-5650 10-10180 10-11832

MANHATTAN DISTRICT, OAK RIDGE, TENN.
10-5117

MARTIN GLENN L. CO., BALTIMORE.
10-7701 10-7981 10-9315
10-10667

MARYLAND. UNIV., COLLEGE PARK.
10-4712 10-6572 10-6854
10-7001

MASSACHUSETTS INST. OF TECH., CAMBRIDGE.
10-843 10-955 10-1341
10-1342 10-1781 10-1812
10-2193 10-3012 10-3189
10-3309 10-3425 10-3526
10-3563 10-3611 10-3739
10-3955 10-4266 10-4285
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10-6433 10-6453 10-6454
10-6625 10-7259 10-7612
10-8593 10-8859 10-8860
10-8879 10-8899 10-9799
10-9916 10-10059

MASSACHUSETTS INST. OF TECH. CAMBRIDGE. AEROELASTIC & STRUCTURES RES. LAB.
10-5590

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DEPT. OF MECHANICAL ENGINEERING.
10-4644 10-5613

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DEPT. OF METALLURGY.
10-183 10-184 10-1383
10-1384 10-1385 10-2069
10-2081 10-2082 10-3285
10-3363 10-3817 10-4643
10-5587 10-5662 10-5733
10-6704 10-6705 10-7133
10-7691 10-7692 10-8397
10-9750 10-9751

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DIGITAL COMPUTER LAB.
10-4773 10-6828

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. DIV. OF INDUSTRIAL COOPERATION.
10-828

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. HYDRODYNAMICS LAB.
10-5582

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. LAB. FOR INSULATION RESEARCH.
10-7084

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. LAB. FOR NUCLEAR SCIENCE.
10-611 10-1506 10-1903
10-3329 10-4524 10-5859

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. LUBRICATION LAB.
10-10179

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. METALLURGICAL PROJECT
10-610 10-836 10-837
10-1740 10-1766 10-2435
10-5269 10-5287 10-5288
10-5289 10-5290 10-5291
10-5298 10-6298 10-6300
10-6301 10-7256 10-9019
10-10720

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. MINERAL ENGINEERING LAB.
10-2392 10-6186 10-6187
10-6244 10-7164 10-7183
10-7254 10-8810 10-8811

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. RESEARCH LAB. OF ELECTRONICS.
10-4695 10-5783 10-6752
10-8513 10-11304

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. SERVOMECHANISMS LAB.
10-2542 10-5306 10-5389
10-6257 10-6823 10-10969

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. SOLID-ST. MOLECULAR THEORY GR.
10-4693

MASSACHUSETTS INST. OF TECH., CAMBRIDGE. SPECTROSCOPY LAB.
10-6158 10-8463 10-8464
10-8524 10-8586

MASSACHUSETTS INST. OF TECH., OAK RIDGE, TENN. ENG. PRACTICE SCHOOL
10-2105 10-2404 10-3482
10-3554 10-6408 10-7113
10-7303 10-9014 10-9772
10-10766

MASSACHUSETTS INST. OF TECH., WATERTOWN, MASS. MINERAL ENG. LAB.
10-3347 10-4162 10-6185
10-6243 10-7163 10-7165
10-7180 10-7182 10-7183
10-7202 10-7203 10-7204
10-7205 10-7206 10-7207
10-7252 10-8778 10-8779
10-8789 10-8809 10-8812
10-8831 10-10739 10-10800
10-10801 10-10802 10-10803
10-10838

MERRILL CO., SAN FRANCISCO.
10-725 10-1298

METAL HYDRIDES INC., BEVERLY, MASS.
10-2255 10-2616 10-6276
10-8879

METAL HYDRIDES INC. CHEMICAL RESEARCH LAB., BEVERLY, MASS.
10-5266

METALLURGICAL ADVISORY COMMITTEE ON TITANIUM.
10-179 10-6699 10-10191

METALLURGY DEVELOPMENT ADVISORY COMMITTEE, AEC.
10-855

METALLURGICAL RES. DEV. CO., INC., WASHINGTON, D. C.
10-6649

MICHIGAN STATE COLL., EAST LANSING.
10-50 10-1723

MICHIGAN STATE COLL., EAST LANSING. KEDZIE CHEMICAL LAB.
10-632 10-633

MICHIGAN STATE UNIV., EAST LANSING.
10-2970 10-7466 10-8171

MICHIGAN UNIV., ANN ARBOR.
10-564 10-565 10-1208
10-3715 10-3767 10-5675
10-5680 10-7017 10-8016
10-8406 10-10596 10-11432

MICHIGAN, UNIV., ANN ARBOR. ENGINEERING RESEARCH INST.
10-14 10-124 10-484
10-512 10-1162 10-2025
10-2613 10-4651 10-4908
10-7702 10-8427 10-9332
10-9919 10-10197

MIDVALE CO., PHILADELPHIA.
10-2163

MIDWEST RESEARCH INST., KANSAS CITY, MO.
10-203 10-9255

MIDWESTERN UNIVERSITIES RESEARCH ASSN., URBANA, ILL.
10-5999 10-6000 10-6001
10-6853 10-7014 10-7015
10-7016 10-7017 10-8016
10-8017 10-8694 10-8695
10-10596

MINE SAFETY APPLIANCES CO., CALLERY, PENNA.
10-120 10-576 10-847
10-1775 10-2789 10-5583
10-5596 10-6031 10-6526
10-6617 10-6751 10-6985
10-7566 10-7639 10-7656
10-7779 10-7988 10-8350
10-8357 10-8373 10-9122
10-9254 10-9602 10-10130
10-10135

MINNESOTA MINING AND MFG. CO., ST. PAUL.
10-1750

MINNESOTA. UNIV., AUSTIN. HORMEL INST.
10-11119

MINNESOTA. UNIV., MINNEAPOLIS.
10-2732 10-2757 10-2758
10-3130 10-4608 10-6000
10-7726

MINNESOTA. UNIV., MINNEAPOLIS. HEAT TRANSFER LAB.
10-5597

MINNESOTA. UNIV., MINNEAPOLIS. UNIVERSITY HOSPITAL.
10-2005

MISSOURI SCHOOL OF MINES AND METALLURGY, ROLLA.
10-6715 10-7725

MONSANTO CHEMICAL CO., DAYTON, OHIO.
10-3612 10-3671 10-4607
10-5968 10-6109 10-7124
10-9120 10-9816 10-10868

MONSANTO CHEMICAL CO., ST. LOUIS.
10-8266 10-8267 10-8268
10-8269 10-8270 10-8271

MOUND LAB., MIAMISBURG, OHIO.
10-11 10-12 10-13
10-116 10-546 10-645
10-668 10-1427 10-1429
10-1429 10-1430 10-1839
10-2112 10-2195 10-2278
10-2485 10-2578 10-2684
10-2727 10-2966 10-2970
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10-6102 10-6152 10-6249
10-6260 10-6281 10-6256
10-6274 10-7860 10-8027
10-8741 10-10702

NATIONAL ACADEMY OF SCIENCES.
10-6462 10-7391 10-7392
10-7393 10-7394 10-7428
10-7460 10-7928 10-8137

NATIONAL BUREAU OF STDS. NBS-AEC ENGINEERING LAB., BOULDER, COLO.
10-8233

NATIONAL BUREAU OF STDS. WASHINGTON, D. C.
10-63 10-174 10-488
10-604 10-640 10-862
10-952 10-1726 10-2281
10-2304 10-2365 10-2367
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10-6272 10-6307 10-6310
10-6559 10-6819 10-7114
10-7123 10-7246 10-8458
10-8471 10-9230

NATIONAL BUREAU OF STDS. WASHINGTON, D. C.
10-9786 10-11800

NATIONAL INSTITUTES OF HEALTH, BETHESDA, MD.
10-6504

NATIONAL LEAD CO., INC. RAW MATERIALS DEVELOPMENT LAB., WINCHESTER, MASS.
10-66 10-67 10-587
10-727 10-728 10-1302
10-1303 10-1322 10-1323
10-3273 10-3344 10-3790
10-3799 10-4534 10-6505

NATIONAL LEAD CO. OF OHIO, CINCINNATI.
10-1188 10-2457 10-3120
10-3175 10-3806 10-3833
10-4328 10-7274 10-8827
10-10844

NATIONAL LEAD CO. RAW MATERIALS DEVELOPMENT LAB., WINCHESTER, MASS.
10-8287

NATIONAL RADIAC, INC., NEWARK, N. J.
10-6861

NATIONAL RESEARCH CORP., CAMBRIDGE, MASS.
10-824 10-8423

NATIONAL RESEARCH COUNCIL.
10-8137

NATIONAL RESEARCH COUNCIL. COMMITTEE ON TABLES OF CONSTANTS & NUMERICAL DATA.
10-1520

NATIONAL RESEARCH COUNCIL. DIV. OF BIOLOGY AND AGRICULTURE.
10-5500

NATIONAL RESEARCH COUNCIL. MATERIALS ADVISORY BOARD.
10-177 10-4654 10-5508
10-7705

NATIONAL RESEARCH COUNCIL OF CANADA, OTTAWA.
10-6623

NAVAL AIR EXPERIMENTAL STA. AERONAUTICAL MATERIALS LAB., PHILADELPHIA.
10-7697

NAVAL BOILER AND TURBINE LAB., PHILADELPHIA.
10-842

NAVAL DENTAL SCHOOL. NATIONAL NAVAL MEDICAL CENTER, BETHESDA, MD.
10-9036

NAVAL ENGINEERING EXPERIMENT STATION, ANNAPOLIS.
10-5610 10-6694 10-9312
10-10185

NAVAL ENGINEERING EXPERIMENT STATION, MECHANICAL LAB., ANNAPOLIS.
10-4591

NAVAL ENGINEERING EXPERIMENT STATION, METALLURGICAL LAB., ANNAPOLIS.
10-1809 10-7700

NAVAL ENGINEERING EXPERIMENT STATION, WAVE MECHANICS LAB., ANNAPOLIS.
10-4592

NAVAL MATERIAL LAB., BROOKLYN.
10-6860

NAVAL MEDICAL RESEARCH INST., BETHESDA, MD.
10-16 10-514 10-1164
10-1165 10-4506 10-4507
10-4792 10-5476 10-5484
10-6470 10-6504 10-7390
10-7395 10-7859 10-7870
10-9036

NAVAL ORDNANCE LAB., CORONA, CALIF.
10-2751 10-2752 10-2788
10-5612 10-7830 10-8100
10-8459 10-8460

NAVAL ORD. LAB., WHITE OAK, MD.
10-4692 10-10275 10-11169

NAVAL ORDNANCE TEST STATION, INYOKERN CHINA LAKE, CALIF.
10-7710 10-10001 10-10192
10-11041 10-11837

NAVAL POSTGRADUATE SCHOOL, MONTEREY, CALIF.
10-7873

NAVAL RADIOLOGICAL DEFENSE LAB., SAN FRANCISCO.
10-16 10-21 10-22
10-503 10-518 10-537
10-779 10-1097 10-1189
10-1241 10-1697 10-1846
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10-8141 10-8142 10-8152
10-8153 10-9069 10-9924
10-9925 10-9926 10-11060
10-11663 10-11664 10-11693

NAVAL RESEARCH LAB. METALLURGY DIV., WASHINGTON, D. C.
10-7715 10-7716

NAVAL RESEARCH LAB., WASHINGTON, D. C.
10-182 10-577 10-586
10-849 10-850 10-891
10-1080 10-1088 10-1382
10-1507 10-1704 10-1871
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10-9323 10-9324 10-9423
10-10193 10-10552 10-10636
10-10638 10-11179 10-11935

NAVAL SCHOOL OF AVIATION MEDICINE, PENSACOLA, FLA.
10-4991 10-7796

NEVADA. UNIV., RENO. MACKAY SCHOOL OF MINES.
10-5565 10-7558

NEW BRUNSWICK LAB., AEC, N. J.
10-81 10-3915 10-3999
10-5145 10-6133 10-10720
10-10721

NEW ENGLAND MATERIALS LAB., INC., MEDFORD, MASS.
10-9325

NEW HAMPSHIRE. UNIV., DURHAM.
10-3747 10-10105

NEW JERSEY. CERAMIC RESEARCH STATION, NEW BRUNSWICK.
10-6651

NEW MEXICO. UNIV., ALBUQUERQUE.
10-6521 10-10285 10-10291

NEW YORK NAVAL SHIPYARD. MATERIAL LAB., BROOKLYN.
10-9321

NEW YORK OPERATIONS OFFICE, AEC.
10-851 10-5155 10-6361
10-7134 10-7243 10-9732

NEW YORK OPERATIONS OFFICE. HEALTH AND SAFETY LAB., AEC.
10-10 10-252 10-2248
10-6493 10-7019

NEW YORK OPERATIONS OFFICE. SPECIAL MATERIALS DIV., AEC.
10-2446

NEW YORK. STATE UNIV. COLL. OF CERAMICS, ALFRED.
10-790 10-791 10-894
10-5620

NEW YORK UNIV., NEW YORK.
10-251 10-8461 10-8462
10-8465 10-10203

NEW YORK UNIV., NEW YORK. ATOMIC ENERGY COMMISSION COMPUTING FACILITY.
10-235 10-2805 10-4774
10-5892 10-8527 10-11340
10-11887 10-11888 10-11889
10-11890 10-11891

NEW YORK UNIV., NEW YORK. COLL. OF ENGINEERING.
10-172 10-754 10-848
10-5591 10-10151

NEWPORT NEWS SHIPBUILDING AND DRY DOCK CO., VA.
10-3944 10-5000

NEW MEXICO. UNIV., ALBUQUERQUE.
10-3998

NORTH AMERICAN AVIATION, INC., DOWNEY, CALIF.
10-1495 10-2258 10-2318
10-2497 10-2544 10-2554
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10-11058

NORTH AMERICAN AVIATION, INC., LOS ANGELES.
10-2316 10-2317 10-2319
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10-6148 10-6309 10-7149
10-7304 10-7342

NORTH CAROLINA STATE COLL., RALEIGH.
10-1099 10-1557 10-2814
10-2896 10-4843 10-4847
10-4848 10-4907 10-5957
10-9212 10-9213 10-9214

NORTH CAROLINA. UNIV., CHAPEL HILL.
10-6180 10-6181

NORTHWEST ELECTRODEVELOPMENT LAB., ALBANY, OREG.
10-1390 10-3132

NORTHWESTERN UNIV., EVANSTON, ILL.
10-6558

NORTHWESTERN UNIV., EVANSTON, ILL. NORTHWESTERN TECHNOLOGICAL INST.
10-6707

NUCLEAR DEVELOPMENT ASSOCIATES, INC., WHITE PLAINS, N. Y.
10-312 10-1496 10-1497
10-1558 10-1559 10-1560
10-1561 10-5272 10-10991

NUCLEAR DEVELOPMENT CORP. OF AMERICA, WHITE PLAINS, N. Y.
10-332 10-3150 10-6928
10-6984

NUCLEAR METALS, INC., CAMBRIDGE, MASS.
10-2077

NUCLEAR POWER GROUP, CHICAGO.
10-1151

OAK RIDGE GASEOUS DIFFUSION PLANT, TENN.
10-1335 10-3353 10-3374
10-3837 10-3841 10-3842
10-3883 10-4761 10-4790
10-5822 10-6055 10-7613
10-8522 10-10021 10-10274
10-11792

OAK RIDGE INST. OF NUCLEAR STUDIES, INC., TENN.
10-544 10-3773 10-10084
10-11346

OAK RIDGE NATIONAL LAB., TENN.
10-42 10-43 10-82
10-105 10-129 10-130
10-210 10-244 10-320
10-489 10-579 10-612
10-720 10-721 10-884
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OAK RIDGE NATIONAL LAB., Y-12 AREA, TENN.
10-2280 10-2476 10-3274
10-3278 10-3794 10-3836
10-4130 10-4131 10-4141
10-4150 10-4283 10-4331
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10-7117 10-7118 10-7119
10-7120 10-7121 10-7265
10-9783 10-9814 10-10832

OAK RIDGE OPERATIONS OFFICE. RESEARCH AND DEVELOPMENT DIV., AEC.
10-3930

OAK RIDGE SCHOOL OF REACTOR TECHNOLOGY, TENN.
10-5961 10-10513

OHIO STATE UNIV., COLUMBUS.
10-7015 10-9675

OHIO STATE UNIV., COLUMBUS. CRYOGENIC LAB.
10-6925

OHIO STATE UNIV. RESEARCH FOUNDATION, COLUMBUS.
10-132 10-764 10-788
10-789 10-1347 10-1896
10-3959 10-4620 10-4645
10-5619 10-6522 10-6652
10-7464 10-9415 10-9921
10-10000 10-10152 10-10153
10-11098

OHMART CORP., CINCINNATI.
10-10260

OKLAHOMA AGRICULTURAL AND MECHANICAL COLL., STILLWATER.
10-7463

OLIN MATHIESON CHEMICAL CORP., BALTIMORE.
10-573 10-574 10-1721
10-1722 10-1723 10-1724
10-1725 10-5509 10-5510
10-5511 10-6522 10-7464
10-7465 10-7466 10-7598
10-8171 10-9118 10-9119
10-10000 10-11146 10-11710

OREGON STATE COLL., CORVALLIS.
10-9749 10-10782

OREGON, UNIV., EUGENE.
10-561

PACIFIC NORTHWEST POWER GROUP, RICHLAND, WASH.
10-4934

PARIS, ECOLE POLYTECHNIQUE, LABORATOIRE.
10-11962

PENN-TEXAS CORP., NEW YORK.
10-8033

PENNSYLVANIA SALT MFG. CO., PHILADELPHIA.
10-739 10-6565

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK.
10-149 10-1727 10-5741
10-6547 10-7647 10-7811

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. COLL. OF CHEMISTRY AND PHYSICS.
10-2008 10-8182 10-10004

PENNSYLVANIA STATE UNIV., UNIVERSITY PARK. COLL. OF MINERAL INDUSTRIES.
10-5630 10-6653 10-7467
10-9302

PENNSYLVANIA STATE UNIV., UNIV. PARK. MINERAL INDUSTRIES EX. STATION
10-1720 10-3922 10-3923
10-4038 10-6666

PENNSYLVANIA STATE UNIV., UNIV. PARK. PETROLEUM REFINING LAB.
10-892 10-4586 10-5588
10-5589 10-6618

PENNSYLVANIA, UNIV., PHILADELPHIA.
10-53 10-883 10-11057
10-11710

PENNSYLVANIA, UNIV., PHILADELPHIA. SCHOOL OF MECHANICAL ENGINEERING.
10-8345

PENNSYLVANIA, UNIV., PHILADELPHIA. SCHOOL OF METALLURGICAL ENG.
10-5544

PHILLIPS PETROLEUM CO. ATOMIC ENERGY DIV., IDAHO FALLS, IDAHO.
10-115 10-128 10-241
10-373 10-377 10-378
10-379 10-380 10-381
10-567 10-746 10-839
10-1027 10-1035 10-1036
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10-9826 10-9883 10-10735
10-10830 10-10883 10-10894
10-10906 10-10915 10-10951
10-10976 10-11114

PHILLIPS PETROLEUM CO. ATOMIC POWER DIV., IDAHO FALLS, IDAHO.
10-3855 10-4573 10-8337

PICATINNY ARSENAL, DOVER, N. J.
10-6581

PICATINNY ARSENAL, SAMUEL FELTMAN AMMUNITION LABS., DOVER, N. J.
10-5525 10-6709 10-11692

PITTSBURGH, UNIV.
10-2023 10-2997 10-5770

PITTSBURGH, UNIV. GRADUATE SCHOOL OF PUBLIC HEALTH.
10-2006 10-8162

PITTSBURGH, UNIV. SARAH MELLON SCAIFE RADIATION LAB.
10-7645 10-7939

PLAX CORP., HARTFORD, CONN.
10-8470 10-9391

PRATT & WHITNEY AIRCRAFT DIV., HARTFORD, CONN.
10-11783

PRATT & WHITNEY AIRCRAFT DIV., UNITED AIRCRAFT CORP., HARTFORD, CONN.
10-131 10-6006 10-10284

PRINCETON UNIV., N. J.
10-2305 10-2565 10-6217
10-7122 10-7176 10-7862

PRINCETON UNIV., N. J. FORRESTAL RESEARCH CENTER.
10-4546 10-4595 10-6708
10-7619 10-11781 10-11807

PRINCETON UNIV., N. J. FRICK CHEMICAL LAB.
10-1239 10-3493 10-5118
10-5219 10-5220 10-5221
10-6183 10-10712 10-10713
10-10714 10-10715 10-10716
10-10717 10-10718 10-10719
10-10769 10-10770 10-10795
10-10796 10-10797

PRINCETON UNIV., N. J. PALMER PHYSICAL LAB.
10-7783

PRODUCTION DIV., AEC.
10-4264

PRODUCTION ENG., RES. ASSN. OF GT. BRITAIN, MELTON MOWBRAY LEICS, ENGLAND.
10-187

PROVIDENCE COLL., R. I.
10-6808

PURDUE RESEARCH FOUNDATION, LAFAYETTE, IND.
10-2270 10-2271 10-2314
10-2366 10-2367 10-2368
10-2372 10-2373 10-2374
10-9733

PURDUE UNIV., LAFAYETTE, IND.
10-2269 10-2270 10-2271
10-2310 10-2314 10-2324
10-2341 10-2366 10-2367
10-3492 10-3517 10-3518
10-4136 10-4137 10-4212
10-5196 10-7014 10-7175
10-7177 10-7200 10-7201
10-8049 10-8808 10-9263
10-9758 10-10794

QUANTUM INC., CHESHIRE, CONN.
10-4610

QUARTERMASTER FOOD AND CONTAINER INST., CHICAGO.
10-17 10-18 10-11125
10-11126

QUARTERMASTER RESEARCH AND DEVELOPMENT LABS., PHILADELPHIA.
10-11178

RADIATION LAB., UNIV. OF CALIF., BERKELEY.
10-1585

RADIATION RESEARCH CORP., WEST PALM BEACH, FLA.
10-318

RAND CORP., SANTA MONICA, CALIF.
10-909 10-1089 10-1129
10-1438 10-1836 10-2226
10-2783 10-2784 10-4689
10-5024 10-5667 10-5776
10-5816 10-6757 10-6758
10-6759 10-8506 10-9435
10-9908 10-10309

RAYTHEON MFG. CO., NEWTON, MASS.
10-824

RCA VICTOR DIV., RADIO CORP. OF AMERICA, HARRISON, N. J.
10-10885 10-10886 10-10887
10-10888 10-10889 10-10890

REDSTONE ARSENAL, ORDNANCE MISSILE LABS., HUNTSVILLE, ALA.
10-2109

RENSSELAER POLYTECHNIC INST., TROY, N. Y.
10-1811 10-7728 10-9724
10-11201 10-11328 10-11884

RENSSELAER POLYTECHNIC INST., TROY, N. Y. POWDER METALLURGY LAB.
10-3613 10-3614 10-4642
10-5295 10-6687

REPUBLIC STEEL CORP. METALLURGICAL LAB., CANTON, OHIO.
10-10178

RICHMOND, VA. UNIV.
10-57

RIO DE JANEIRO, CENTRO BRASILEIRO DE PESQUISAS FISICAS.
10-7937 10-8057 10-8058

ROCHESTER, N. Y. UNIV.
10-1003 10-1015 10-3414
10-4097 10-4108 10-4147
10-5008 10-5327 10-9461
10-12061

ROCHESTER, N. Y. UNIV. ATOMIC ENERGY PROJECT.
10-4 10-19 10-20
10-545 10-548 10-556
10-614 10-957 10-1776
10-1982 10-1983 10-1984
10-2243 10-2974 10-3092
10-3096 10-3097 10-3099
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10-8138 10-8139 10-8163
10-9923 10-11253 10-11609

ROCK ISLAND ARSENAL LAB., ILL.
10-4699 10-7834 10-11808

ROHM AND HAAS CO., PHILADELPHIA.
10-2991

ROHM AND HAAS CO. RESEARCH LABS., PHILADELPHIA.
10-107 10-722 10-723
10-724 10-1767 10-2015
10-2035 10-2036 10-2037
10-2617 10-2664 10-2665
10-2686 10-2687 10-2688
10-2689 10-2690 10-2992
10-3114 10-3115 10-3277
10-3342 10-3343 10-11136

RUTGERS UNIV., NEW BRUNSWICK, N. J.
10-1219 10-6531

RUTGERS UNIV., NEW BRUNSWICK, N. J. COLL. OF ENGINEERING.
10-3133

RUTGERS UNIV., NEW BRUNSWICK, N. J. SCHOOL OF CHEMISTRY.
10-5512 10-6528 10-11694

RYAN AERONAUTICAL CO., LINDBERG FIELD, SAN DIEGO, CALIF.
10-1366 10-6684

S-K-C- RESEARCH ASSOCIATES, PATTERSON, N. J.
10-6649

SAINT LOUIS UNIV.
10-5511 10-6005

SANDIA CORP., ALBUQUERQUE, N. MEX.
10-845 10-1331 10-3288
10-7242 10-7268 10-7281
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10-10870 10-10871 10-10872
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10-10876 10-10877 10-10878
10-10879 10-10880 10-11245

SAUNDERS KERBY INC., NEW YORK.
10-7266 10-8842

SCHOOL OF AVIATION MEDICINE, RANDOLPH AFB, TEXAS.
10-1166 10-1717 10-5447
10-7387 10-7388 10-7389
10-11606

SCHWARZKOPF DEVELOPMENT CORP., YONKERS, N. Y.
10-8408

SHELL DEVELOPMENT CO., EMERYVILLE, CALIF.
10-584 10-585 10-9253
10-10146 10-11793 10-11867

SMITH A. O. CORP., MILWAUKEE.
10-2163

SOUTHERN RESEARCH INST., BIRMINGHAM, ALA.
10-7731

SOUTHWEST RESEARCH INST., SAN ANTONIO.
10-737 10-1730 10-1780
10-7636

SPECTROCHEMICAL LABS., INC., PITTSBURGH.
10-8737

STANDARD OIL CO. OF INDIANA, WHITING.
10-2055 10-5585 10-5586
10-7635 10-8313 10-8351

STANDARD OIL DEVELOPMENT CO., ELIZABETH, N. J.
10-6163
STANFORD RESEARCH INST., MENLO PARK, CALIF.
10-635 10-2019 10-4688
10-5551 10-6564 10-6756
10-7512 10-8237 10-8251
10-9194 10-10025 10-11755
10-11845
STANFORD UNIV., CALIF.
10-4594 10-7620 10-9544
10-11771 10-11946
STANFORD UNIV., CALIF. HIGH-ENERGY PHYSICS LAB.
10-6004 10-9495 10-11407
STANFORD UNIV., CALIF. MICROWAVE LAB.
10-8011
STANFORD UNIV. OAKI ASTI. CALIF. W. W. HANSEN LABS. OF PHYSICS.
10-1014
STANFORD UNIV., PALO ALTO, CALIF. MICROWAVE LAB.
10-406 10-1079
SYLVANIA ELECTRIC PRODUCTS INC. ATOMIC ENERGY DIV., BAYSIDE, N. Y.
10-854 10-1803 10-1815
10-1816 10-2447
SYLVANIA ELECTRIC PRODUCTS INC., BAYSIDE, N. Y.
10-3818 10-4046 10-4047
10-8904 10-9801
SYLVANIA ELECTRIC PRODUCTS INC., BAYSIDE, N. Y.
10-5293 10-5294 10-6135
10-6304 10-7365 10-8426
10-9800
SYLVANIA ELECTRIC PRODUCTS INC. METALLURGICAL LABS., BAYSIDE, N. Y.
10-3819 10-4666 10-4677
10-6303 10-6718 10-7228
10-9340
SYRACUSE UNIV., N. Y.
10-5510 10-5679 10-7465
10-10199
SYRACUSE UNIV., N. Y. METALLURGICAL RESEARCH LABS.
10-7734
SYRACUSE UNIV., N. Y. RESEARCH INST.
10-6700

TECHNICAL INFORMATION SERVICE, AEC.
10-502 10-1170 10-1817
10-2168 10-2579 10-2726
10-2727 10-3043 10-3128
10-3169 10-3179 10-3235
10-3256 10-3283 10-3301
10-3876 10-4575 10-5104
10-5429 10-5438 10-6712
10-9328
TECHNICAL INFORMATION SERVICE EXTENSION, AEC.
10-10163 10-10196 10-10668
10-11843
TECHNICAL OPERATIONS, INC., ARLINGTON, MASS.
10-7933 10-8666
TECHNION RESEARCH & DEV. FOUNDATION LTD., HAIFA, ISRAEL.
10-8468
TEMPLE UNIV., PHILADELPHIA. RESEARCH INST.
10-10150
TENNESSEE EASTMAN CORP., OAK RIDGE, TENN.
10-1317 10-3140 10-3162
10-3210 10-3481 10-3527
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10-9754 10-9765 10-9787
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10-10831 10-10869 10-10891
TENNESSEE, UNIV., KNOXVILLE.
10-83 10-763 10-1169
10-2062 10-3769 10-6055
10-7846 10-8396 10-9702
10-10165
TENNESSEE VALLEY AUTHORITY, WILSON DAM, ALA.
10-2259 10-2260 10-2261
10-2262 10-2263 10-2264
10-2265 10-2266 10-3418
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10-5163 10-5164 10-5165
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10-5169 10-5170 10-5171
10-5172
TEXAS AGRICULTURAL EXPERIMENT STATION, COLLEGE STATION, TEX.
10-7396
TEXAS, UNIV., AUSTIN, RADIOBIOLOGICAL LAB.
10-5442 10-11343
TEXAS, UNIV., AUSTIN, SANITARY ENGINEERING LABS.
10-3101 10-3341
THOMPSON PRODUCTS, INC., CLEVELAND.
10-7713
TORONTO, UNIV. INST. OF AEROPHYSICS.
10-9259 10-11305
TRACERLAB, INC., BOSTON.
10-4777 10-7863
TRACERLAB, INC., WESTERN DIV., BERKELEY, CALIF.
10-2626
TRANE CO., LA CROSSE, WISC.
10-11783
TRUDEAU FOUNDATION, SARANAC LAKE, N. Y.
10-2969
TUFTS COLL., MEDFORD, MASS.
10-1320 10-1641 10-1728
10-3124 10-3276 10-7264
TUFTS UNIV., MEDFORD, MASS.
10-7469 10-7470

UNION CARBIDE NUCLEAR CO., K-25 PLANT, OAK RIDGE, TENN.
10-8512
UNION CARBIDE NUCLEAR CO., PADUCAH PLANT, KY.
10-3203 10-8512 10-10022
UNION CARBIDE AND CARBON RESEARCH LABS., NIAGARA FALLS, N. Y.
10-7122
UNION CARBIDE NUCLEAR CO., Y-12 PLANT, OAK RIDGE, TENN.
10-84 10-616 10-3027
10-7875
UNITED CARBON PRODUCTS CO., INC., BAY CITY, MICH.
10-6144 10-7142 10-8784
10-9734
UNITED KINGDOM ATOMIC ENERGY AUTH., IND. GROUP H. Q., RISLEY, LANCS, ENGLAND.
10-1055 10-1060 10-4929
10-7377 10-8362 10-8661
UNITED KINGDOM ATOMIC ENERGY AUTH., RES. GP., CHEM. DIV., WOOLWICH OUTSTA., ENG.
10-8209
UNITED STATES PHOSPHORIC PRODUCTS DIV., TENNESSEE CORP., TAMPA, FLA.
10-11132
UNITED STATES STONEWARE CO., TALLMADGE, OHIO.
10-9285 10-11809

UNIVERSAL-CYCLOPS STEEL CORP., BRIDGEVILLE, PENNA.
10-7733
UNIVERSITY OF NOTRE DAME, SOUTH BEND, IND.
10-6707
UNIVERSITY OF SOUTHERN CALIFORNIA, LOS ANGELES.
10-1214 10-5513 10-6524
10-6529 10-10076 10-10077
10-10078 10-10079 10-10080
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SUBJECT INDEX FOR VOLUME 10

The user of this subject index should bear in mind that subjects, rather than words, have been indexed. The indexer tries to select what to him seems to be the most probable and logical place to look for the information under consideration. Since it is not possible to know exactly where users of the index might look for certain items of information, numerous cross references are included to guide the user to other sources of information on related subjects. Thus, the user must decide what the indexer would consider to be the most appropriate index entries for specific items of information. This problem, however, is inherent in the preparation and use of any subject index and is not, in any sense, peculiar to the index of *Nuclear Science Abstracts*.

Generally, the direct form of subject entry is used in this index rather than inverted headings or, in some cases, subheadings; e.g., Amino acids rather than Acids, amino; Helium isotopes He^4 rather than Helium—isotopes He^4 or Helium—He^4 isotopes. Note, however, that in some cases modifying terms are used parenthetically in preference to using a more direct type of entry which would result in the scattering of information; e.g., Sodium (liquid) rather than Liquid sodium. Organic compounds, on the contrary, are usually entered in the index in the inverted form so that substituted compounds are listed near the parent compound, e.g., Benzene, bromo- rather than Bromobenzene. In general, the style of nomenclature used is that of Chemical Abstracts except that some items listed there as subheadings are elevated to form part of the main heading, e.g., Butyric acid, ethyl esters rather than Butyric acid—ethyl esters. Salts of organic acids are indexed in a similar fashion.

Inorganic compounds are indexed in the direct form, listing cations in the order of increasing valence in the case of polycationic salts of varying valence and in alphabetic order for polycationic salts in which all cations have the same valence; e.g., Sodium aluminum sulfates and Potassium sodium sulfates.

In general, any one specific item of information is entered in the index in every place where the user might probably look for it; e.g., an item on sodium–potassium alloys is entered under both Sodium–potassium alloys and Potassium–sodium alloys. A study of the effects of x radiation on hair will be found under both X radiation and Hair. Note, however, that if a dog has been used arbitrarily as the experimental animal, the information will not be found under Dogs as it is assumed that the same results would have been obtained in tests on other animals. Note also that papers are not usually entered under broad general headings; e.g., a paper on treatment of thyroid disease with I^{131} will be listed under Thyroid diseases and under Iodine isotopes I^{131}, but not under Radiotherapy.

Main headings are listed in alphabetic order. A parenthetic qualifier following a main heading is disregarded in alphabetizing unless there is more than one so that the modifier determines the order; e.g., Sodium, Sodium (gaseous), Sodium (liquid), Sodium acetates.

Descriptive phrases (modifiers) rather than ordinary subheadings are used under the main headings to give a better indication of the material covered in an abstract than would be possible with only a word or two. Such phrases are written so that the idea considered most important is presented first, if this does not result in too awkward an expression. However, in searching the index it is advisable to scan all the modifiers under a main heading in order to determine which abstracts should be consulted for the desired information. Many of the modifiers are designed to be read in inverted order or to be read with the main heading inserted at the position of the comma in order to obtain a meaningful phrase; e.g., Uranium—allotropic transformation temperatures of, effect of cooling rate on is read "effect of cooling rate on allotropic transformation temperatures of uranium." Experience in using an index of this type will be the best guide in obtaining the desired information, and a consideration of synonymous, or nearly synonymous, terms will prove valuable.

The number followed by a colon is the volume number, and the numbers following are the abstract numbers. The designation (R) following an abstract number indicates that it is an abstract of a progress report; the designation (J) indicates that it is an abstract of a journal (published literature) article; and the designation (P) indicates that it is an abstract of a patent. Abstract numbers for reports other than progress reports carry no letter designations.

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519	10-10736	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
523	10-3510	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
538	10-2358	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
664	10-2397	See CN-527
708	10-2359	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
726	10-2360	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
728	10-3511	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
731	10-2361	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
732	10-2362	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
740	10-3465	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)

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A		
748	10-2309	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
750	10-2471	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
754	10-3462	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
777	10-2363	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
796	10-3498	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
849	10-4348	See CP-644
872	10-4472	See CP-668
888	10-2310	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
901	10-9878	See CP-715
923	10-5180	See CN-727
942	10-6293	See CT-751A
988	10-3553	See CN-795
1008	10-3512	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1025	10-3513	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1030	10-10737	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1058	10-3514	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1064	10-7122	Dep.; $4.80(ph OTS); $2.70(mf OTS)
1072	10-3751	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1076	10-3419	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1083	10-3515	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1099	10-4159	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1185	10-2441	See CT-890
1240	10-4134	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1268	10-2249	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1268(Suppl.)	10-2342	See A-2108
1277	10-3516	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1315	10-3713	See CT-883
1347	10-6376	See CE-951
1432	10-3416	See CL-1039
1448	10-2379	See CN-1060
1460	10-4410	See CP-1069
1481	10-2522	See CE-1074
1507	10-2341	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1511	10-2269	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1617	10-6395	See CP-1129
1618	10-5274	See CK-1130
1620	10-3683	See CE-1132
1635	10-3684	See CE-1149
1636	10-3685	See CE-1150
1681	10-5208	See CC-1201
1685	10-4171	See CN-1205
1748	10-8780	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1788	10-6213	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1874	10-3480	See CC-1321
1898	10-9795	See CT-1349
1899	10-3709	See CP-1350
1971	10-8842	Dep.(mc); $43.20(ph OTS); $11.10(mf OTS)
2004	10-3501	See CK-1359
2006	10-4411	See CP-1361
2010	10-2377	See CC-1366
2022	10-4362	See CP-1381
2024	10-3681	See CC-1383
2032	10-9833	See CE-1391
2043	10-3710	See CP-1456
2044	10-6312	See CN-1457
2065	10-4293	See CT-1477
2066	10-8995	See CT-1480
2083	10-5097	See CC-1500
2094	10-5276	See CT-1515
2096	10-5109	See CC-1517
2108	10-2342	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2135	10-5345	See CP-2269
2157	10-3420	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2158	10-3421	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2204	10-5098	See CK-1526
2207	10-3502	See CK-1529
2239	10-3609	See CT-1571
2243	10-6396	See CP-1577
2246	10-10947	See CP-1580
2254	10-3758	See CP-1589
2260	10-3759	See CP-1598
2263	10-2285	See CC-1432
2267	10-6138	See CC-1606
2282	10-8951	See CE-1439
2288	10-6450	See CC-1607
2295	10-8930	See CP-1626
2300	10-4210	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2301	10-4135	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2308	10-4160	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2309	10-5188	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2313	10-5189	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2314	10-2364	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2316	10-7174	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2319	10-5190	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2321	10-2365	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2322	10-5191	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2323	10-5192	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2324	10-5193	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2325	10-5194	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2327	10-5195	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
2329(Pt. II)	10-9737	Dep.(mc); $45.00(ph OTS); $11.10(mf OTS)
2329(Pts. III and IV)	10-4211	Dep.(mc); $36.30(ph OTS); $10.20(mf OTS)
2412	10-3736	See CP-1676
2431	10-3504	See CN-1702
2435	10-8990	See CP-1707
2437	10-3503	See CK-1712
2443	10-3658	See CP-1729
2445	10-3760	See CP-1732
2450	10-4292	See CP-1738
2456	10-7158	See CN-1745
2458	10-4349	See CP-1748
2482	10-4464	See CC-1631
2489	10-4470	See CF-1627
2553	10-3466	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2555	10-5129	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2557	10-5130	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

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A		
2586	10-4151	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2588	10-2311	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2609	10-5277	See CT-1780
2621	10-4142	See CN-1791
2631	10-4201	See CK-1803
2640	10-4412	See CP-1814
2644	10-3748	See CP-1818
2654	10-9794	See CP-1829
2661	10-3608	See CP-1837
2663	10-3715	See CT-1897
2670	10-5181	See CN-1656
2689	10-5182	See CN-1881
2702	10-3517	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2703	10-2366	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2704	10-4212	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2705	10-2367	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2706	10-5196	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2707	10-4136	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2708	10-4137	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2709	10-3518	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2710	10-2324	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2711	10-2270	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2712	10-2271	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2714	10-2368	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2715	10-7175	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
2803	10-6139	See CC-1915
2811	10-10983	See CC-1925
2820	10-4294	See CT-1937
2839	10-8785	See CP-1961
2864	10-4154	See CN-1869
2878	10-5331	See CN-2027
2903	10-2272	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2907	10-5106	Dep.(mc); $15.30(ph OTS); $5.70(mf OTS)
2910	10-6158	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2911	10-7176	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2912(Vol. I)	10-4010	Dep.; $1.00(OTS)
2912(Vol.III)	10-4011	Dep.; $1.75(OTS)
2934	10-10785	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2940	10-3422	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2943	10-7123	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2949	10-6120	See AECD-4019
2950	10-3601	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3005	10-4413	See CP-1989
3011	10-2456	See CN-2069
3013	10-4414	See CP-2071
3023	10-5278	See CT-1985
3039	10-4173	See CN-1873
3043	10-4172	See CN-1859
3143	10-2369	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3166(Rev.)	10-6214	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3205	10-4213	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3209	10-4340	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3226	10-2370	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3247	10-10992	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3254	10-2371	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3271	10-5197	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3387	10-3519	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3446	10-7272	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3447	10-7266	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3502	10-3423	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3505	10-3520	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3506	10-3521	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3507	10-3522	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3511	10-2325	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3513	10-2312	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3550	10-3523	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3552	10-2313	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3554	10-3524	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3608	10-5131	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3624	10-6315	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3625	10-5301	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3747	10-2314	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3784	10-2400	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3845	10-5302	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3846	10-5322	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3889	10-6217	See AECD-3892
3904	10-2250	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3905	10-2251	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3920	10-6265	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3947	10-2566	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3954	10-3463	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3957	10-3624	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3962	10-2343	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3972	10-9733	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4013	10-6140	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4014	10-6141	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4017	10-2273	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4018	10-3424	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4022	10-2274	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4024	10-3525	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4028	10-2275	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4044	10-5198	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
4045	10-822	Dep.; $3.30(ph OTS); $2.40(mf OTS)
4047	10-3741	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4062	10-2372	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4064	10-2373	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4065	10-2374	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4174	10-2276	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4243	10-5349	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4254	10-2402	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4256	10-6354	Dep.; $0.20(OTS)
4257	10-2507	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4315	10-4366	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4735	10-4468	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)

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ACCO		
1	10-660	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5	10-661	Dep.(mc); $4.80 (ph OTS); $2.70(mf OTS)
8	10-2980	Dep.; $0.20(OTS)
19	10-3111	Dep.; $0.30(OTS)
25	10-2658	Dep.; $0.20(OTS)
27	10-2981	Dep.; $0.25(OTS)
29	10-2659	Dep.; $0.20(OTS)
30	10-742	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
31	10-2677	Dep.; $0.15(OTS)
32	10-2982	Dep.; $0.25(OTS)
33	10-662	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
35	10-2983	Dep.; $0.25(OTS)
36	10-2984	Dep.; $0.25(OTS)
38	10-663	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
38(Suppl.)	10-2043	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
40	10-2985	Dep.; $0.30(OTS)
42	10-2660	Dep.; $0.20(OTS)
45	10-6586	Dep.; $6.30(ph OTS); $3.00(mf OTS)
46	10-3117	Dep.; $0.40(OTS)
48	10-3118	Dep.; $0.25(OTS)
50	10-664	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
51	10-665	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52	10-2661	Dep.; $0.20(OTS)
53	10-2986	Dep.; $0.25(OTS)
55	10-2678	Dep.; $0.15(OTS)
56	10-1286	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
57	10-666	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
58	10-667	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
59	10-3119	Dep.; $0.20(OTS)
60	10-3049	Dep.; $0.25(OTS)
61	10-2987	Dep.; $0.25(OTS)
63	10-7557	Dep.; $0.40(OTS)
ACRH		
4	10-3167	Dep.; $16.80(ph OTS); $5.70(mf OTS)
5	10-8159	Dep.; $13.80(ph OTS); $4.80(mf OTS)
AEC-tr		
2104	10-9145	JCL
2104(p.1-6)	10-9146	
2104(p.7-27)	10-9147	
2104(p.28-42)	10-9148	
2104(p.43-54)	10-9149	
2104(p.55-60)	10-9150	
2104(p.73-5)	10-9151	
2156	10-3766	Dep.; $0.60(OTS)
2230	10-549	JCL
2232	10-868	JCL
2254	10-1131	Associated Technical Services (Trans. 55G6R), East Orange, N. J.
2260	10-869	JCL
2266	10-980	JCL
2267	10-1588	JCL
2268	10-1589	JCL
2273	10-5	JCL
AEC-tr		
2274	10-6	JCL
2275	10-510	JCL
2276	10-7	JCL
2277	10-870	JCL
2278	10-306	Associated Technical Services (Trans. 06G7R), East Orange, N. J.
2279	10-229	Associated Technical Services (Trans. 04G7R), East Orange, N. J.
2283	10-224	Columbia Technical Translation (CL-13535, Item A), White Plains, N. Y.
2284	10-225	Columbia Technical Translation (CL-13535, Item B), White Plains, N. Y.
2285	10-108	JCL
2286	10-485	JCL
2287	10-86	JCL
2288	10-321	JCL
2289	10-1017	Consultants Bureau (Collection No. 4 of Soviet Research in High Energy Fission), New York
2290	10-550	JCL
2291	10-551	JCL
2292	10-491	Associated Technical Services (Trans. 01G7R), East Orange, N. J.
2293	10-204	Associated Technical Services (Trans. 59G6R), East Orange, N. J.
2294	10-272	JCL
2295	10-333	JCL
2296	10-499	JCL
2297	10-1119	JCL
2298	10-308	Associated Technical Services (Trans. 68G7R), East Orange, N. J.
2299	10-226	Associated Technical Services (Trans. 53G6R), East Orange, N. J.
2300	10-309	Associated Technical Services (Trans. 71G7R), East Orange, N. J.
2301	10-1120	JCL
2302	10-273	JCL
2303	10-274	JCL
2304	10-275	JCL
2305	10-1068	Consultants Bureau, New York
2306	10-1069	Consultants Bureau, New York
2307	10-1070	Consultants Bureau (Collection No. 4 of Soviet Research in High Energy Fission), New York
2308	10-1071	Consultants Bureau (Collection No. 4 of Soviet Research In High Energy Fission), New York
2309	10-1121	JCL
2310	10-997	JCL
2311	10-1102	JCL
2312	10-1103	JCL
2313	10-871	JCL
2314	10-765	JCL
2315	10-939	JCL
2316	10-902	JCL
2317	10-766	JCL
2318	10-872	JCL
2319	10-930	JCL

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2320	10-913	Associated Technical Services (Trans. 60G6R), East Orange, N. J.
2324	10-895	Associated Technical Services (Trans. 61G6R), East Orange, N. J.
2325	10-897	Associated Technical Services (Trans. 02G7R), East Orange, N. J.
2326	10-897	
2327	10-1155	JCL
2328	10-588	JCL
2329	10-1413	Associated Technical Services (Trans. 69G7R), East Orange, N. J.
2330	10-1414	Associated Technical Services (Trans. 70G7R), East Orange, N. J.
2331	10-958	Available from Associated Technical Services (Trans. 49G7R), East Orange, N. J.
2332	10-1620	Associated Technical Services (Trans. 03G7R), East Orange, N. J.
2333	10-914	Available from Associated Technical Services (Trans. 05G7R), East Orange, N. J.
2334	10-1415	Associated Technical Services (Trans. No. 87G6R), East Orange, N. J.
2335	10-1431	Associated Technical Services (Trans. No. 94G7G), East Orange, N. J.
2338	10-1643	JCL
2339	10-1644	JCL
2340	10-1645	JCL
2341	10-1646	JCL
2342	10-1647	JCL
2343	10-3926	JCL
2344	10-1348	JCL
2345	10-1648	JCL
2347	10-1824	JCL
2348	10-1255	JCL
2349	10-1416	Associated Technical Services (Trans. 62G7R), East Orange, N. J.
2350	10-1460	Associated Technical Services (Trans. 27G7R), East Orange, N. J.
2351	10-1444	Associated Technical Services (Trans. 94G6R), East Orange, N. J.
2352	10-1243	
2353	10-1257	
2354	10-1324	JCL
2355	10-1962	JCL
2356	10-1864	JCL
2357	10-1841	Associated Technical Services (Trans. 97G7R), East Orange, N. J.
2358	10-1945	Associated Technical Services (Trans. 83G7R), East Orange, N. J.
2359	10-1940	Associated Technical Services (Trans. 93G6R), East Orange, N. J.
2360	10-1731	JCL
2361	10-1768	JCL
2362	10-2971	JCL
2363	10-2238	JCL
2364	10-2060	Associated Technical Services, (Trans. 93G7G), East Orange, N. J.
2365	10-2085	Associated Technical Services (Trans. 95G7G), East Orange, N. J.
2366	10-2086	Associated Technical Services (Trans. 96G7G), East Orange, N. J.
2367	10-2016	Associated Technical Services (Trans. 45G8R), East Orange, N. J.
2368	10-2605	JCL
2369	10-2770	Associated Technical Services (Trans. 84G7R), East Orange, N. J.
2370	10-2869	Associated Technical Services (Trans. 36G8R), East Orange, N. J.
2371	10-2848	LC
2372	10-3019	LC
2373	10-3017	JCL
2374	10-3051	JCL
2375	10-2705	JCL
2376	10-2618	JCL
2377	10-2737	JCL
2379	10-2706	JCL
2380	10-2901	LC
2382	10-3223	LC
2383	10-3242	LC
2384	10-3131	LC
2385	10-3094	JCL
2386	10-3238	LC
2387	10-3152	Associated Technical Services (Trans. 82H8R), East Orange, New Jersey
2388	10-3326	JCL
2389	10-3170	LC
2390	10-3910	JCL
2391	10-3138	Associated Technical Services (Trans. 83H8R), East Orange, New Jersey
2393	10-3296	JCL
2394	10-3302	JCL
2395	10-3224	Associated Technical Services (Trans. 93H8R), East Orange, N. J.
2396	10-3171	JCL
2398	10-3245	JCL
2399	10-3214	JCL
2400	10-3261	JCL
2401	10-3263	JCL
2402	10-3294	JCL
2403	10-9447	JCL
2404	10-3191	JCL
2405	10-3306	LC
2406	10-3172	LC
2407	10-3178	JCL
2408	10-5752	
2409	10-3247	Associated Technical Services (Trans. 21H9R), East Orange, N. J.
2410	10-9341	JCL
2411	10-3778	JCL
2412	10-9496	Consultants Bureau
2414	10-3208	JCL
2415	10-3297	Lawyers & Merchants Translation Bureau, New York

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AEC-tr		
2417	10-4070	JCL
2418	10-3941	JCL
2420	10-3264	Associated Technical Services (Trans. No. 41H9G), East Orange, N. J.
2421	10-3782	JCL
2422	10-3783	JCL
2423	10-3827	JCL
2424	10-3828	JCL
2425	10-9342	JCL
2426	10-3371	JCL
2427	10-3265	JCL
2428	10-3831	JCL
2429	10-3370	JCL
2430	10-3269	JCL
2431	10-3849	JCL
2432	10-3364	JCL
2433	10-3829	JCL
2434	10-3835	JCL
2435(Pt.1)	10-4061	Dep.; $1.25(GPO)
2435((Pt.1) (p.1-14))	10-4090	
2435((Pt.1) (p.15-28))	10-4111	
2435((Pt.1) (p.29-38))	10-4073	
2435((Pt.1) (p.39-58))	10-4091	
2435((Pt.1) (p.59-68))	10-4112	
2435((Pt.1) (p.69-80))	10-4074	
2435((Pt.1) (p.81-94))	10-4075	
2435((Pt.1) (p.95-108))	10-4076	
2435((Pt.1) (p.109-22))	10-4092	
2435((Pt.1) (p.123-32))	10-4098	
2435((Pt.1) (p.133-40))	10-4093	
2435((Pt.1) (p.141-60))	10-4094	
2435((Pt.1) (p.161-6))	10-4095	
2435((Pt.1) (p.167-82))	10-4077	
2435((Pt.1) (p.183-94))	10-4078	
2435((Pt.1) (p.195-208))	10-4079	
2435((Pt.1) (p.209-16))	10-4067	
2435((Pt.1) (p.217-26))	10-4099	
2435((Pt.1) (p.227-38))	10-4113	
2435((Pt.1) (p.239-50))	10-4068	
2435((Pt.1) (p.251-4))	10-4050	
2435((Pt.1) (p.255-6))	10-4100	
2435((Pt.1) (p.257-9))	10-4096	
2435(Pt.2)	10-4001	$1.00(GPO)
2435((Pt.2) (p.1-12))	10-4101	
2435((Pt.2) (p.13-22))	10-4024	
2435((Pt.2) (p.23-32))	10-4021	
2435((Pt.2) (p.33-44))	10-4022	
2435((Pt.2) (p.45-54))	10-4023	
2435((Pt.2) (p.55-64))	10-4102	
2435((Pt.2) (p.65-78))	10-4103	
2435((Pt.2) (p.79-84))	10-4104	
2435((Pt.2) (p.85-100))	10-4105	
2435((Pt.2) (p.101-10))	10-4106	
2435((Pt.2) (p.111-24))	10-4107	
2435((Pt.2) (p.125-8))	10-4117	
2435((Pt.2) (p.129-44))	10-4019	
2435((Pt.2 (p.145-52))	10-4020	
2435((Pt.2) (p.153-62))	10-4002	
2435((Pt.2) (p.163-76))	10-4003	
2435((Pt.2) (p.177-86))	10-4018	
2435((Pt.2) (p.187-206))	10-4039	
2435((Pt.2) (p.207-14))	10-4051	
2435(Pt.3)	10-3962	$1.00(GPO)
2435((Pt.3) (p.1-16))	10-4036	
2435((Pt.3) (p.17-26))	10-4052	
2435((Pt.3) (p.27-38))	10-4004	
2435((Pt.3) (p.39-48))	10-4053	
2435((Pt.3) (p.49-62))	10-4054	
2435((Pt.3) (p.63-70))	10-4055	
2435((Pt.3) (p.71-84))	10-4029	
2435((Pt.3) (p.85-96))	10-4056	
2435((Pt.3) (p.97-104))	10-4057	
2435((Pt.3) (p.105-14))	10-4058	

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2435((Pt.3) (p.115-18))	10-4059	
2435((Pt.3) (p.119-28))	10-4034	
2435((Pt.3) (p.129-44))	10-4040	
2435((Pt.3) (p.145-52))	10-4041	
2435((Pt.3) (p.153-62))	10-4042	
2435((Pt.3) (p.163-72))	10-4043	
2435((Pt.3) (p.173-82))	10-4044	
2435((Pt.3) (p.183-93))	10-4069	
2435(Pt.4)	10-3965	$1.00(GPO)
2435((Pt.4) (p.1-14))	10-3986	
2435((Pt.4) (p.15-20))	10-3970	
2435((Pt.4) (p.21-32))	10-3971	
2435((Pt.4) (p.33-44))	10-3982	
2435((Pt.4) (p.45-58))	10-3972	
2435((Pt.4) (p.59-68))	10-3973	
2435((Pt.4) (p.69-78))	10-3974	
2435((Pt.4) (p.79-88))	10-3975	
2435((Pt.4) (p.89-100))	10-3976	
2435((Pt.4) (p.101-6))	10-3977	
2435((Pt.4) (p.107-12))	10-3978	
2435((Pt.4) (p.113-20))	10-3987	
2435((Pt.4) (p.121-6))	10-3988	
2435((Pt.4) (p.127-38))	10-3989	
2435((Pt.4) (p.139-44))	10-3990	
2435((Pt.4) (p.145-54))	10-3991	
2435((Pt.4) (p.155-62))	10-3992	
2435((Pt.4) (p.163-72))	10-3993	
2435((Pt.4) (p.173-80))	10-3994	
2435((Pt.4) (p.181-8))	10-3995	
2435((Pt.4) (p.189-97))	10-3996	
2436	10-3916	JCL
2437	10-3927	JCL
2438	10-3802	JCL
2439	10-3934	JCL
2440	10-3830	JCL
2441	10-3808	JCL
2442	10-3822	JCL
2443	10-3935	JCL
2444	10-3803	JCL
2445	10-3823	JCL
2446	10-3918	JCL
2447	10-3919	JCL
2448	10-3832	JCL
2449	10-3936	JCL
2450	10-3781	JCL
2451	10-3892	JCL
2452	10-3893	JCL
2453	10-3894	JCL
2454	10-3895	JCL
2455	10-3905	JCL
2456	10-3902	JCL
2457	10-3920	JCL
2458	10-3928	JCL
2459	10-3931	JCL
2460	10-3840	Associated Technical Services(Trans-26H9G), East Orange, N. J.
2461	10-4476	JCL
2462	10-3896	JCL
2463	10-4005	JCL
2464	10-3983	JCL
2465	10-4006	JCL
2466	10-4116	JCL
2467	10-4007	JCL
2468	10-3966	JCL
2469	10-3937	JCL
2470	10-4026	JCL
2471	10-4032	JCL
2472	10-4488	JCL
2474	10-4060	JCL
2475	10-4008	JCL
2476	10-4030	JCL
2477	10-4561	JCL
2478	10-4626	JCL
2479	10-6570	JCL
2480	10-7471	JCL
2481	10-7472	JCL
2482	10-5825	JCL
2483	10-6533	JCL
2484	10-7473	JCL
2485	10-11799	Dep.(mc); LC
2486	10-12116	Dep.(mc); LC
2487	10-6777	JCL
2488	10-6778	JCL
2489	10-5860	JCL
2490	10-6659	JCL
2491	10-6779	JCL
2492	10-5861	JCL
2493	10-6458	JCL
2494	10-6723	JCL
2495	10-6724	JCL
2496	10-7785	JCL
2497	10-6725	JCL
2498	10-5568	JCL

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AEC-tr		
2499	10-5527	JCL
2500	10-6760	JCL
2501	10-7474	JCL
2502	10-7401	JCL
2503	10-7786	JCL
2504	10-7659	JCL
2505	10-5683	JCL
2507	10-7736	JCL
2511	10-7576	JCL
2512	10-7648	JCL
2513	10-7649	JCL
2514	10-8183	JCL
2515	10-7475	JCL
2516	10-8311	JCL
2517	10-8472	JCL
2519	10-6534	JCL
2521	10-6550	JCL
2522	10-6726	JCL
2523	10-6535	JCL
2524	10-8473	JCL
2525	10-8346	JCL
2527	10-7476	JCL
2528	10-8288	JCL
2529	10-7383	JCL
2530	10-8289	JCL
2531	10-7737	JCL
2532	10-8363	JCL
2533	10-8184	JCL
2534	10-9387	JCL
2535	10-8519	JCL
2536	10-8528	JCL
2537	10-8314	JCL
2538	10-8239	JCL
2539	10-8290	JCL
2541	10-8185	JCL
2542	10-7450	JCL
2543	10-8186	JCL
2544	10-8187	JCL
2545	10-8563	JCL
2547	10-8214	JCL
2548	10-8215	JCL
2551	10-8347	JCL
2554	10-9264	Dep.(mc); JCL
2555	10-10265	Dep.(mc); JCL
2556	10-10206	Dep.(mc); JCL
2557	10-9448	Dep.(mc); JCL
2558	10-11892	Dep.(mc); JCL
2559	10-11893	Dep.(mc); JCL
2560	10-11894	Dep.(mc); JCL
2562	10-12117	Dep.(mc); JCL
2563	10-11895	Dep.(mc); JCL
2564	10-11275	Dep.(mc); JCL
2565	10-11868	Dep.(mc); JCL
2566	10-11869	Dep.(mc); JCL
2567	10-11785	Dep.(mc); JCL
2568	10-11896	Dep.(mc); JCL
2569	10-11897	Dep.(mc); JCL
2570	10-11917	Dep.(mc); JCL
2571	10-11898	Dep.(mc); JCL
2572	10-11276	Dep.(mc); JCL
2573	10-11899	Dep.(mc); JCL
2574	10-11277	Dep.(mc); JCL
2575	10-11900	Dep.(mc); JCL
2576	10-11870	Dep.(mc); JCL
2577	10-11712	Dep.(mc); JCL
2579	10-11713	Dep.(mc); JCL
2582	10-12086	Dep.(mc); JCL
2583	10-11871	Dep.(mc); JCL
2584	10-11936	Dep.(mc); JCL
2585	10-11901	Dep.(mc); JCL
2586	10-11902	Dep.(mc); JCL
2587	10-11903	Dep.(mc); JCL
2588	10-12118	Dep.(mc); JCL
2589	10-11904	Dep.(mc); JCL
2590	10-11872	Dep.(mc); JCL
2591	10-11278	Dep.(mc); JCL
2592	10-11279	Dep.(mc); JCL
2593	10-11905	Dep.(mc); JCL
2594	10-11280	Dep.(mc); JCL
2595	10-11906	Dep.(mc); JCL
2596	10-11281	Dep.(mc); JCL
2597	10-11918	Dep.(mc); JCL
2598	10-11924	Dep.(mc); JCL
2599	10-11300	Dep.(mc); JCL
2600	10-11282	Dep.(mc); JCL
2601	10-11907	Dep.(mc); JCL
2602	10-11283	Dep.(mc); JCL
2603	10-11925	Dep.(mc); JCL
2604	10-11284	Dep.(mc); JCL
2605	10-11908	Dep.(mc); JCL
2606	10-11246	Dep.(mc); JCL
2607	10-11926	Dep.(mc); JCL
2608	10-11586	Dep.(mc); JCL
2609	10-11285	Dep.(mc); JCL
2610	10-11286	Dep.(mc); JCL
2612	10-11801	Dep.(mc); JCL
2613	10-11587	Dep.(mc); JCL
2614	10-11287	Dep.(mc); JCL
2615	10-11288	Dep.(mc); JCL
2617	10-11295	Dep.(mc); JCL
2618	10-11909	Dep.(mc); JCL
2619	10-11910	Dep.(mc); JCL
2620	10-11289	Dep.(mc); JCL
2621	10-11911	Dep.(mc); JCL
2622	10-11290	Dep.(mc); JCL
2623	10-11873	Dep.(mc); JCL
2625	10-11802	Dep.(mc); JCL
2626	10-11937	Dep.(mc); JCL
2627	10-11912	Dep.(mc); JCL

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AEC-tr		
2628	10-11291	Dep.(mc); JCL
2629	10-10276	Dep.(mc); JCL
2630	10-11127	Dep.(mc); JCL
2631	10-11043	Dep.(mc); JCL
2632	10-10049	Dep.(mc); JCL
2633	10-10005	
2634	10-9927	Dep.(mc); JCL
2635	10-9988	Dep.(mc); JCL
2636	10-10277	Dep.(mc); JCL
2637	10-10278	Dep.(mc); JCL
2638	10-11247	Dep.(mc); JCL
2648	10-11767	Dep.(mc); JCL
2652	10-11768	Dep.(mc); JCL
AECD		
3003(Rev.)	10-8861	Dep.; $0.30(OTS)
3030	10-7169	See UCRL-718
3634	10-3127	Dep.; $0.25(OTS)
3650	10-884	Dep.; $0.15(OTS)
3651	10-757	Dep.; $0.20(OTS)
3653	10-1085	Dep.; $0.30(OTS)
3655	10-1013	Phys. Rev. 102, 823-30(1956) (Condensed)
3656	10-373	Dep.; $0.20 (OTS)
3661	10-3030	Dep.; $0.40(OTS)
3662	10-604	Dep.; $0.15(OTS)
3663	10-1636	Dep.; $0.30(OTS)
3664	10-560	Dep.; $0.40(OTS)
3665	10-1803	Nuclear Sci. and Eng. 1, 92-101(1956); Dep.; $0.20(OTS)
3666	10-1544	Dep.; $0.50(OTS)
3668	10-1921	Dep.; $0.45(OTS)
3670	10-1545	Dep.; $0.15(OTS)
3671	10-1315	Dep.; $0.15(OTS)
3672	10-1765	Dep.; $0.15(OTS)
3673	10-2070	Dep.; $0.35(OTS)
3674	10-1230	Superseded by LA-1721(Rev.)
3675	10-1546	Dep.; $0.30(OTS)
3677	10-1922	Dep.; $0.55(OTS)
3678	10-1027	Dep.(mc); $63.00(ph OTS); $11.10(mf OTS)
3679	10-2021	Dep.; $0.45(OTS)
3680	10-1804	Dep.; $0.40(OTS)
3681	10-2161	Dep.; $0.35(OTS)
3682	10-2162	Dep.; $0.45(OTS)
3683	10-117	Dep.(mc); $3.30 (ph OTS); $2.40 (mf OTS)
3684	10-11	Dep.(mc); $10.80 (ph OTS); $3.90 (mf OTS)
3685	10-12	Dep.(mc); $12.30 (ph OTS); $4.50 (mf OTS)
3686	10-13	Dep.(mc); $10.80 (ph OTS); $3.90 (mf OTS)
3687	10-4027	Dep.; $1.00(OTS)
3688	10-829	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3691	10-2142	Dep.; $0.30(OTS)
3692	10-11132	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3693	10-3008	Dep.; $0.30(OTS)
3694	10-668	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3695	10-546	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3696	10-2071	Dep.; $0.20(OTS)
3698	10-1316	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3699	10-3855	Dep.; $0.20(OTS)
3700	10-2988	Dep.; $0.30(OTS)
3701	10-2679	Dep.; $0.30(OTS)
3702	10-3129	Dep.; $0.15(OTS)
3703	10-3120	Dep.; $0.35(OTS)
3704	10-2702	Dep.; $0.35(OTS)
3705	10-3335	Dep.; $0.35(OTS)
3706	10-3824	Dep.; $0.40(OTS)
3707	10-3856	Dep.; $0.30(OTS)
3708	10-3336	Dep.; $0.15(OTS)
3709	10-3857	Dep.; $0.20(OTS)
3710	10-1231	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3711	10-3858	Dep.; $0.15(OTS)
3712	10-3943	Dep.; $0.40(OTS)
3713	10-3796	Dep.; $0.20(OTS)
3714	10-1188	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3715	10-3381	Dep.; $0.15(OTS)
3716	10-3382	Dep.; $0.25(OTS)
3717	10-3805	Dep.; $0.25(OTS)
3718	10-3218	Dep.; $0.15(OTS)
3719	10-3383	Dep.; $0.20(OTS)
3720	10-3859	Dep.; $0.15(OTS)
3721	10-3860	Dep.; $0.15(OTS)
3722	10-3924	Dep.; $0.10(OTS)
3724	10-3310	Dep.; $0.20(OTS)
3725	10-7558	Dep.; $0.20(OTS)
3726	10-2797	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3727	10-2978	Dep.; $0.15(OTS)
3728	10-3254	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3731	10-4080	Dep.; $0.65(OTS)
3732	10-9965	Dep.; $0.15(OTS)
3734	10-3288	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3735	10-3806	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3736	10-3833	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3739	10-8521	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3775	10-6104	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3776	10-8781	Dep.(mc); $3.30(ph OTS); $3.00(mf OTS)
3777	10-2252	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3778	10-4264	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3779	10-4265	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3780	10-4323	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3781	10-4324	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3782	10-7293	Dep.; $0.20(OTS)
3783	10-10868	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3784	10-7177	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3786	10-6443	Dep.; $0.15
3787	10-3634	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3789	10-2449	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3790	10-2277	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3791	10-2494	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3792	10-2495	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

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3793	10-2253	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3794	10-4284	Dep.; $0.20(OTS)
3795	10-6215	Dep.; $0.30(OTS)
3796	10-4462	Dep.; $0.15(OTS)
3797	10-6161	Dep.; $0.20(OTS)
3798	10-9024	Dep.; $0.30(OTS)
3799	10-2469	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3800	10-2434	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3801	10-2375	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3802	10-4315	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3803	10-2435	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3805	10-2376	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3807	10-3478	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3808	10-2244	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3809	10-2326	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3810	10-3479	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3811	10-2278	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3812	10-2403	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3813	10-2462	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3814	10-2254	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3815	10-4458	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3816	10-6355	Dep.; $0.30(OTS)
3817	10-2242	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3818	10-7306	Dep.; $0.30(OTS)
3819	10-4316	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3820	10-4317	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3821	10-10899	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3822	10-8940	Dep.; $0.40(OTS)
3823	10-4325	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3824	10-4326	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3825	10-2279	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3826	10-2255	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3827	10-7178	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3828	10-2436	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3829	10-2280	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3830	10-2470	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3831	10-4262	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3832	10-6216	Dep.(mc); $3.30(ph OTS); $3.40(mf OTS)
3834	10-4333	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3835	10-6274	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3836	10-2281	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3837	10-6356	Dep.; $0.15(OTS)
3838	10-6105	Dep.; $0.15(OTS)
3839	10-5259	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3840	10-8941	Dep.; $0.65(OTS)
3841	10-2557	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3842	10-2548	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3843	10-6275	Dep.; $1.00(OTS)
3844	10-7300	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3845	10-2282	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3846	10-3649	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
3847	10-3589	Dep.(mc); $3.00(ph OTS); $2.40(mf OTS)
3848	10-3642	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3849	10-3643	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3850	10-3425	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3851	10-3526	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3852	10-4285	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3853	10-4214	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3854	10-3527	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3856	10-3752	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3857	10-4286	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3858	10-5199	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3859	10-3481	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3860	10-6357	Dep.; $0.20(OTS)
3861	10-7141	Dep.; $0.20(OTS)
3862	10-3672	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3863	10-8878	Dep.; $0.30(OTS)
3864	10-3616	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3865	10-3474	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3867	10-3528	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3868	10-5303	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3869	10-3673	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3870	10-4122	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3871	10-9011	Dep.; $0.20(OTS)
3872	10-6261	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3873	10-4258	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3874	10-3753	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3875	10-3529	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3876	10-4287	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3877	10-5093	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3878	10-7179	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3879	10-4138	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3880	10-7255	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3881	10-4139	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3882	10-4367	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3883	10-4156	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3884	10-5263	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3885	10-7152	Dep. $0.20(OTS)
3886	10-6444	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3887	10-4198	Dep.(mc); $3.40(ph OTS); $2.40(mf OTS)
3888	10-4215	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3889	10-5107	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3890	10-4288	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3891	10-3602	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
3892	10-6217	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3893	10-5337	Dep.(mc); $22.80(ph OTS); $7.20(mf OTS)
3894	10-5343	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3895	10-4327	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3896	10-3592	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3897	10-3530	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3898	10-5200	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3899	10-5201	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3900	10-4266	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3901	10-3581	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3902	10-5350	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3903	10-3603	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)

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3904	10-5264	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3905	10-3482	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3906	10-5147	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3907	10-4216	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3908	10-3531	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3909	10-3754	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3910	10-3532	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3911	10-3533	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3912	10-8784	Dep.; $0.25(OTS)
3913	10-6144	Dep.; $0.20(OTS)
3914	10-7142	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3915	10-9734	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3916	10-3604	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3917	10-3534	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3918	10-5202	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3919	10-4217	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3920	10-6358	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3921	10-4368	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3922	10-5351	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3923	10-10830	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3924	10-2508	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3925	10-6359	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3926	10-6259	Dep.; $0.15(OTS)
3927	10-2256	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3928	10-3738	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3929	10-5265	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3930	10-3733	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3931	10-3674	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3932	10-3535	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3933	10-4218	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3934	10-4161	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3935	10-3536	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3936	10-4219	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3937	10-3537	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3938	10-4199	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3939	10-9012	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3940	10-5415	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3941	10-3734	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3942	10-4369	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3943	10-6425	Dep.; $0.30(OTS)
3944	10-10704	Dep.; $1.00(OTS)
3945	10-3538	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3946	10-4220	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3947	10-3539	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3948	10-4370	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3949	10-3605	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
3950	10-4221	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3951	10-3590	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3952	10-3540	Dep.(mc); $3.50(ph OTS); $2.40(mf OTS)
3953	10-3541	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3954	10-3542	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3955	10-3543	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3956	10-4222	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3957	10-4223	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3958	10-5352	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3959	10-3544	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3960	10-3545	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3961	10-5203	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3962	10-5260	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3963	10-4224	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3964	10-5094	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3965	10-3546	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3966	10-3619	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3967	10-10705	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3968	10-8758	Dep.; $0.30(OTS)
3969	10-7113	Dep.; $0.25(OTS)
3970	10-5204	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3971	10-3675	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3972	10-5316	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3973	10-6360	Dep.(mc); $1.80(ph OTS); $1.80(ph OTS)
3974	10-8917	Dep.; $0.15(OTS)
3975	10-8846	Dep.; $0.15(OTS)
3976	10-9826	Dep.; $0.55(OTS)
3977	10-5266	Dep.; $0.20(OTS)
3978	10-9894	Dep.; $0.75(OTS)
3979	10-9827	Dep.; $0.20(OTS)
3980	10-5353	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3981	10-6218	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3982	10-9020	Dep.; $0.15(OTS)
3983	10-4332	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3984	10-3742	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3985	10-4371	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3986	10-7289	Dep.; $0.25(OTS)
3987	10-5148	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3988	10-6361	Dep.; $0.25(OTS)
3989	10-3676	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3990	10-8942	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3991	10-3426	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3992	10-4328	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3993	10-4225	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3994	10-3665	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3995	10-4140	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3997	10-9814	Dep.; $0.30(OTS)
3998	10-7356	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3999	10-7365	Dep.; $0.20(OTS)
4000	10-4336	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4001	10-5267	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4002	10-4329	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4003	10-10738	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4004	10-4259	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4005	10-6427	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4006	10-9752	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4007	10-10786	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4008	10-9786	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4009	10-6307	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4010	10-6219	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4011	10-5354	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4012	10-5355	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4013	10-7307	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

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4014	10-5356	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4015	10-4141	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4016	10-4372	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4017	10-4267	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4018	10-4373	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4019	10-6120	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4020	10-8943	Dep.; $0.20(OTS)
4021	10-5357	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4022	10-4341	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4023	10-5268	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
4024	10-4342	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4025	10-5358	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4026	10-5149	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4028	10-5095	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4030	10-5108	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4031	10-7246	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
4032	10-5359	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4033	10-6266	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4034	10-5360	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4035	10-5361	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4036	10-5269	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4037	10-7308	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4038	10-6362	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4039	10-8818	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4040	10-7114	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4041	10-5362	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4042	10-6363	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4043	10-5332	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4044	10-7309	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4045	10-5416	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4046	10-5270	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
4047	10-5317	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4048	10-7256	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
4049	10-6276	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4050	10-5271	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4051	10-5090	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4052	10-5363	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4053	10-5344	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4054	10-6106	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4055	10-6364	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4056	10-6334	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4057	10-8879	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4058	10-9816	Dep.; $0.20(OTS)
4059	10-5272	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4060	10-5364	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4062	10-6121	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4063	10-4162	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4065	10-7138	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4066	10-6249	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4067	10-4153	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4068	10-5318	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4069	10-4374	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4070	10-5081	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4072	10-5365	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4073	10-10831	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4074	10-5366	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4075	10-7108	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4076	10-6277	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4077	10-5304	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4078	10-6330	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4079	10-6324	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4080	10-6365	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4081	10-6124	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4082	10-6337	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4083	10-8944	Dep.; $0.70(OTS)
4084	10-9765	Dep.; $0.50(OTS)
4085	10-6137	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4086	10-6220	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4087	10-6221	Dep.(mc); $4.80(ph OTS); $1.80(mf OTS)
4089	10-6162	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4090	10-6122	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4091	10-6163	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4092	10-6222	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4093	10-6164	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4095	10-8945	Dep.; $0.25(OTS)
4096	10-7357	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4097	10-6152	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4098	10-6347	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4099	10-7283	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4100	10-7124	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4101	10-7180	Dep.; $0.20(OTS)
4102	10-7153	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4103	10-7181	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4104	10-7273	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4105	10-7182	Dep.; $0.20(OTS)
4106	10-7183	Dep.; $0.20(OTS)
4107	10-7125	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4108	10-10739	Dep.; $0.15(OTS)
4109	10-7310	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4110	10-3819	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4111	10-7184	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4112	10-6223	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4113	10-8789	Dep.; $0.25(OTS)
4114	10-6224	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4115	10-6225	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4116	10-6448	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4117	10-9738	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4118	10-6226	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4119	10-6316	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4120	10-6165	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4121	10-6317	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4122	10-6325	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4123	10-6227	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4124	10-6123	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4125	10-8820	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
4126	10-7185	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4127	10-7257	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)

Report	Abstract	Availability
AECD		
4128	10-7186	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4130	10-8790	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4131	10-8791	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4132	10-9739	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4133	10-8880	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4134	10-8881	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4135	10-8882	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4136	10-6228	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4137	10-7154	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4138	10-7155	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4139	10-7187	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4140	10-7188	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4141	10-9753	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4142	10-9740	Dep.; $0.60(OTS)
4143	10-7311	Dep.; $0.40(OTS)
4144	10-8883	Dep.; $0.20(OTS)
4146	10-9741	Dep.; $0.30(OTS)
4147	10-6250	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4149	10-5150	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4150	10-6251	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4151	10-8792	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4152	10-7189	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4153	10-6166	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4154	10-10869	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4155	10-7190	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4156	10-7126	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4157	10-7284	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4158	10-9828	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4159	10-8793	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4160	10-8794	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4161	10-8760	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4162	10-7312	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4163	10-9742	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4165	10-8795	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4166	10-8796	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
4167	10-7366	Dep.; $0.25(OTS)
4168	10-7301	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4169	10-6155	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4170	10-6278	Dep.(mc); $6.03(ph OTS); $3.00(mf OTS)
4171	10-8761	Dep.; $0.25(OTS)
4174	10-8762	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4175	10-8797	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4176	10-7156	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4177	10-9787	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4178	10-8821	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4179	10-8822	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4180	10-8763	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4181	10-10740	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4183	10-9754	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4184	10-7191	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4185	10-7285	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4186	10-8764	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4187	10-8932	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4188	10-7192	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4189	10-8765	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4190	10-9697	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4191	10-9698	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4192	10-8823	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4193	10-8824	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4194	10-9726	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4195	10-6167	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4196	10-6229	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4197	10-6313	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4198	10-6366	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4199	10-6212	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4200	10-7127	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4201	10-7313	Dep.; $0.45(OTS)
4202	10-7128	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4203	10-8798	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4204	10-7151	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4205	10-8825	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4206	10-7193	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4207	10-7112	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4208	10-9899	Dep.; $0.25(OTS)
4209	10-8946	Dep.; $0.15(OTS)
4210	10-7314	Dep.; $0.25(OTS)
4212	10-7129	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4214	10-8884	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4215	10-9829	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4216	10-9755	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4217	10-9830	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4218	10-9013	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4219	10-9831	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4220	10-8933	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4221	10-9021	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4222	10-9895	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4223	10-7302	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4225	10-9900	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4226	10-8938	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4227	10-7237	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4228	10-9788	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4229	10-8947	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4230	10-8782	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4231	10-7303	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4232	10-9014	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4233	10-9772	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4234	10-8766	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4235	10-8826	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
AECU		
2924	10-319	Dep.; $0.10 (OTS)
2979	10-125	Dep.; $0.15 (OTS)
3031	10-3311	Dep.; $1.25(OTS)
3037	10-758	Dep.; $0.20(OTS)
3039	10-50	Dep.; $0.15 (OTS)

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3043	10-512	Dep.; $0.25(OTS)
3046	10-406	Dep.; $12.30 (ph OTS); $4.50 (mf OTS)
3050	10-14	Dep.; $0.25 (OTS)
3058	10-561	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3062	10-2163	Dep.; $1.75(OTS)
3064	10-1720	Dep.; $1.00(OTS)
3071	10-1287	Dep.; $0.30(OTS)
3076	10-1331	Dep.; $0.25(OTS)
3077	10-2025	Dep.; $0.65(OTS)
3078	10-1868	Dep.; $0.60(OTS)
3079	10-1718	Dep.; $0.35(OTS)
3081	10-885	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3082	10-886	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3083	10-735	Ind. Eng. Chem. 47, 2536-9(1955)
3084	10-562	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3085	10-741	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3086	10-993	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3087	10-146	J. Electrochem. Soc. 103, 64-72(1956)
3088	10-994	J. Chem. Phys. 23, 2105-7(1955)
3089	10-483	Dep.(mc); $4.80 (ph OTS); $2.70 (mf OTS)
3090	10-231	Dep.(mc); $3.30 (ph OTS); $2.40 (mf OTS)
3091	10-228	J. Chem. Phys. 23, 2045-9(1955)
3092	10-307	J. Phys. Chem. 60, 498-9(1956)
3093	10-200	J. Chem. Phys. 24, 124-30(1956)
3094	10-487	Dep.(mc); $1.80 (ph OTS); $1.80 (mf OTS)
3095	10-632	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3096	10-173	Dep.(mc); $1.80 (ph OTS); $1.80 (mf OTS)
3097	10-633	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3098	10-743	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3099	10-15	Dep.(mc); $7.80 (ph OTS); $3.30 (mf OTS)
3100	10-535	Dep.; $0.35(GPO)
3101	10-2970	Dep.; $0.30(OTS)
3102	10-1438	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3103	10-909	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3104	10-1014	Phys. Rev. 101, 1131-42(1956)
3105	10-8396	Dep.; $0.45(OTS)
3106	10-995	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
3107	10-941	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3108	10-1028	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3109	10-1160	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
3110	10-1506	Dep.(mc); $31.80(ph OTS); $9.30(mf OTS)
3111	10-1129	Phys. Rev. 102, 331-40(1956)
3112	10-3021	Dep.; $0.15(OTS)
3113	10-3101	Dep.; $0.50(OTS)
3115	10-1327	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
3116	10-1208	Dep.; $13.80(ph OTS); $4.80(mf OTS)
3117	10-1202	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3119	10-1778	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3120	10-1805	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3121	10-1903	Dep(mc); $12.30(ph OTS); $4.50(mf OTS)
3122	10-2226	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3123	10-7826	Dep.; $0.20(OTS)
3124	10-8397	Acta Met. 4, 433-9(1956); Dep.; $0.20(OTS)
3125	10-1836	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3126	10-11432	Dep.; $1.25(OTS)
3127	10-2127	Dep.(mc); $28.80(ph OTS); $8.40(mf OTS)
3129	10-8011	Dep.; $0.25(OTS)
3130	10-2574	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3131	10-2625	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3132	10-2005	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3133	10-2575	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3134	10-2576	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3135	10-2006	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3136	10-2883	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3137	10-5565	Dep.; $0.20(OTS)
3138	10-7827	Dep.; $0.25(OTS)
3139	10-3767	Dep.; $1.00(OTS)
3140	10-2969	Dep.; $15.30(ph OTS); $5.40(mf OTS)
3141	10-2964	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3142	10-2648	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3143	10-8398	Dep.; $0.25(OTS)
3144	10-11328	Dep.; $1.25(OTS)
3145	10-3044	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3147	10-3153	Phys. Rev. 102, 486-8(1956)
3149	10-4754	Dep.; $0.15(OTS)
3155	10-3201	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3156	10-3202	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3157	10-3298	Dep.; $10.80(ph OTS); $3.90(mf OTS)
3158	10-3291	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
3160	10-4908	Dep.; $0.25(OTS)
3162	10-3270	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3163	10-3309	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3165	10-3295	Dep.; $0.35(OTS)
3166	10-3944	Pt. I Dep.; $0.40(OTS) Pt. II Dep.; $0.40(OTS)
3167	10-3280	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3168	10-3281	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3169	10-3250	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3170	10-4909	Dep.; $0.25(OTS)
3171	10-5791	Dep.; $0.35(OTS)
3173	10-3851	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3179	10-3329	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3180	10-5582	Dep.; $0.60(OTS)
3186	10-3967	Dep.; $7.80(ph OTS); $3.30(mf OTS)
3187	10-3984	Dep.; $7.80(ph OTS); $3.30(mf OTS)
3188	10-4037	Dep.(mc); Philippine Embassy, 1617 Mass. Ave., N. W, Washington, D. C. (free)
3190	10-3959	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
3191	10-4045	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3195	10-9598	Dep.; $0.15(OTS)
3196	10-12006	Dep.; $0.15(OTS)
3197	10-4910	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3199	10-4689	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3201	10-9803	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3202	10-10870	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3204	10-9818	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3205	10-8918	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3206	10-9805	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)

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AECU		
3207	10-8905	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3208	10-10871	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3209	10-8906	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3210	10-8924	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3211	10-8925	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3212	10-8907	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
3213	10-9806	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3214	10-9727	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3215	10-10872	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3216	10-10873	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3217	10-10860	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3218	10-9778	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3219	10-9807	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
3221	10-10861	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3226	10-10874	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3227	10-10862	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3228	10-10863	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3229	10-10875	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3231	10-10876	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3232	10-9804	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3233	10-10877	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3234	10-10878	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3238	10-10879	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3239	10-10880	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3250	10-5776	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3251	10-5024	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3252	10-4646	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3253	10-4524	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
3254	10-4911	Dep.; $0.10(OTS)
3256	10-11792	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3257	10-4621	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3258	10-5472	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3262	10-8164	Dep.; $0.40(OTS)
3264	10-6688	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3265	10-10285	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3266	10-11188	Dep.(mc); $19.80(ph OTS); $6.30(mf OTS)
3270	10-7693	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3271	10-7694	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3273	10-8208	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3285	10-9303	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3286	10-9304	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3287	10-9305	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3288	10-9306	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3289	10-9307	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3290	10-9308	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3291	10-9258	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3293	10-10156	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3294	10-10157	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3295	10-10158	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3296	10-10159	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3298	10-11833	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3318	10-11177	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3321	10-12007	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3322	10-12008	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3323	10-12009	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3324	10-12010	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3325	10-12011	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3330	10-11983	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3332	10-11685	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3333	10-12065	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3334	10-11969	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3335	10-12066	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3336	10-12012	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3338	10-12013	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3340	10-12102	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3343	10-12046	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3344	10-12103	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3345	10-11941	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3346	10-11942	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3347	10-12014	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3359	10-11777	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
AL		
329	10-2316	See NAA-SR-4
331	10-5403	See NAA-SR-8
332	10-5404	See NAA-SR-9
333	10-2317	See NAA-SR-10
ANL		
4010	10-4318	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
4066	10-10780	Dep.; $0.30(OTS)
4076	10-3650	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
4092	10-5297	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4097	10-4356	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4153	10-10726	Dep.; $0.30(OTS)
4174	10-3651	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
4177	10-3591	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4181	10-3547	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4182	10-5308	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4196	10-7143	Dep.; $0.25(OTS)
4208	10-3652	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
4224	10-5151	Dep.; $0.15(OTS)
4237	10-4357	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4241	10-9779	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4248	10-4163	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4277	10-3653	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
4294	10-8948	Dep.; $0.55(OTS)
4323	10-3654	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4332	10-6439	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4350	10-3655	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
4369	10-11734	Dep.; $0.30(OTS)
4397	10-2496	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
4400	10-3745	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4402	10-6367	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4428	10-3677	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4437	10-3656	Dep.(mc); $19.80(ph OTS); $6.30(mf OTS)
4475	10-3644	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4477	10-11735	Dep.; $0.30(OTS)
4481	10-8949	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4483	10-2509	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)

Report	Abstract	Availability
ANL		
4487	10-3678	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4509	10-606	Dep.; $0.25(OTS)
4512	10-2510	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4551	10-6368	Dep.; $0.30(OTS)
4573	10-7170	Dep.; $0.25(OTS)
4596	10-2511	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4602	10-3657	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4654	10-3499	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4743	10-2748	Dep.; $0.40(OTS)
4765	10-7144	Dep.; $0.20(OTS)
4769	10-2283	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4775	10-4469	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4801	10-3884	Dep.; $0.20(OTS)
4848	10-777	Dep.; $0.25(OTS)
4905	10-7367	Dep.; $0.25(OTS)
4908	10-6267	Dep.; $0.25(OTS)
4911	10-7130	Dep.; $0.15(OTS)
4912	10-1364	Dep.; $3.30(ph OTS); $2.40(mf OTS)
4926	10-2556	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4937	10-5367	Dep.; $0.25(OTS)
4951	10-2512	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4991	10-2428	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5019	10-10993	Dep.; $0.40(OTS)
5021	10-7368	Dep.; $0.50(OTS)
5030	10-6268	Dep.; $0.40(OTS)
5075	10-6449	Dep.; $0.20(OTS)
5084	10-5205	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5204	10-8922	Dep.; $0.15(OTS)
5205	10-3784	Dep.; $0.20(OTS)
5206	10-3338	Dep.; $0.15(OTS)
5207	10-3339	Dep.; $0.15(OTS)
5240	10-3330	Dep.; $0.70(OTS)
5300	10-8252	Nuclear Sci. and Eng. 1, 33-52(1956)
5322	10-2567	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5324	10-1008	Dep.; $6.30(ph OTS); $3.00(mf OTS)
5334	10-4916	Dep.; $0.30(OTS)
5354	10-1806	Dep.; $1.00(OTS)
5360	10-3193	Dep.; $0.30(OTS)
5361	10-2042	Dep.; $0.15(OTS)
5367	10-1637	Dep.; $0.55(OTS)
5379	10-3384	Dep.; $0.60(OTS)
5387	10-353	Phys. Rev. 100, 172-3(1955)
5399	10-5623	Dep.; $0.40(OTS)
5409	10-3800	Dep.; $0.35(OTS)
5412	10-1837	Dep.; $12.30(ph OTS); $4.50(mf OTS)
5420	10-4690	Dep.; $1.00(OTS)
5431	10-374	Dep.; $1.00 (OTS)
5446	10-1992	Dep.; $7.80(ph OTS); $3.30(mf OTS)
5449	10-1365	Dep.; $0.25(OTS)
5472	10-3321	J. Appl. Phys. 27, 557-72(1956)
5480	10-330	Nuclear Sci. and Eng. 1, 174-84(1956); Dep.; $4.80 (ph OTS); $2.70 (mf OTS)
5486	10-1161	Dep.; $16.80(ph OTS); $5.70(mf OTS)
5491	10-1029	Dep.; $1.80(ph OTS); $1.80(mf OTS)
5497	10-6748	Dep.; $0.55(OTS)
5498	10-7776	Dep.; $0.65(OTS)
5499	10-3110	Dep.; $1.00(OTS)
5500	10-3355	Dep.; $0.20(OTS)
5501	10-3020	Acta Cryst. 9, 607-14(1956); Dep.; $4.80 (ph OTS); $2.70(mf OTS)
5509	10-9697	Nucleonics 14, No. 3, 61-5; No. 4, 65-71; and No. 5, 77-82(1956)
5512	10-3289	A.I.Ch.E. Journal 2, 205-10(1956); Dep.; $0.30(OTS)
5513	10-3226	Nuclear Sci. and Eng. 1, 126-34(1956) (Condensed); Dep.; $0.25(OTS)
5517	10-3028	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5518	10-3327	Dep.; $1.00(OTS)
5522	10-3352	Dep.; $0.50(OTS)
5523	10-3323	Phys. Rev. 103, 942-8(1956); Dep.; $4.80 (ph OTS); $2.70(mf OTS)
5524	10-3365	Dep.; $0.30(OTS)
5525	10-3380	Phys. Rev. 103, 921-42(1956); Dep.; $15.30(ph OTS); $5.40(mf OTS)
5532	10-3861	Dep.; $0.40(OTS)
5534	10-5025	Dep.; $0.30(OTS)
5545	10-3357	Dep.; $0.20(OTS)
5552	10-3862	Dep.; $0.30(OTS)
5557	10-4540	Dep.; $0.35(OTS)
5567	10-7931	Dep.; $0.75(OTS)
5574	10-9068	Dep.; $0.75(OTS)
5575	10-6621	Dep.; $1.00(OTS)
5576	10-6460	Dep.; $0.50(OTS)
5577	10-4917	Dep.; $0.45(OTS)
5593	10-7559	Dep.; $0.30(OTS)
5596	10-11661	Dep.; $0.40(OTS)
5597	10-11607	Dep.; $0.55(OTS)
5603	10-10120	Dep.; $0.15(OTS)
5608	10-11950	Dep.; $0.20(OTS)
5615	10-12060	Dep.; $0.25(OTS)
5618	10-12067	Dep.; $1.00(OTS)
ANL-FF		
318G	10-878	J. Metals 7, 1214-18(1955)
ANL-FGF		
2	10-1147	J. Metals 7, 1206-14(1955)
ANL-GRH		
16	10-2648	See AECU-3142
ANL-SM		
122	10-6368	See ANL-4551
ANL-WMM		
437	10-5151	See ANL-4224
1140	10-3024	Dep.; $0.15(OTS)
APEX		
121	10-6369	Dep.; $0.15(OTS)
167	10-11124	Dep.; $0.30(OTS)
218	10-1993	Dep.; $4.80(ph OTS); $2.70(mf OTS)
233	10-7979	Dep.; $0.20(OTS)

Report	Abstract	Availability
APEX		
238	10-3004	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
244	10-6690	Dep.; $0.40(OTS)
248	10-4071	Dep.; $0.20(OTS)
261	10-11555	Dep.; $1.25(OTS)
B		
4,380,121	10-9900	See AECD-4225
4,380,216	10-5147	See AECD-3906
4,380,223	10-4216	See AECD-3907
6,460,1	10-6330	See AECD-4078
6,460,2	10-5304	See AECD-4077
6,460,6	10-6124	See AECD-4981
6,460,11	10-3634	See AECD-3787
6,460,13	10-4315	See AECD-3802
6,460,14	10-3531	See AECD-3908
6,480,1	10-4336	See AECD-4000
BBC		
3	10-8885	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
5	10-6279	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
9	10-6280	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
10	10-6281	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
13	10-6282	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
15	10-9789	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
16	10-6283	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
18	10-9790	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
19	10-6284	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
21	10-8886	Dep.(mc); $3.30(ph OTS)
22	10-6285	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
25	10-6286	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
31	10-8887	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
34	10-8888	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
38	10-8889	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
39	10-9791	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
41	10-8799	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
43	10-10839	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
44	10-9728	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51	10-8890	Dep.; $0.40(OTS)
54	10-9792	Dep.; $0.50(OTS)
BC		
18	10-5206	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
27	10-5096	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
71	10-2345	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
BK		
20230	10-5254	See CP-2108
50213	10-5254	See CP-2108
50222	10-5254	See CP-2108
50239	10-5254	See CP-2108
BM		
7	10-9757	See M-1047
8	10-8807	See M-1048
12	10-5154	See M-2177
13	10-6239	See M-2178
14	10-6182	See M-2179
BM-II		
96	10-3132	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
BM-RI		
5169	10-1807	Dep.(mc); Bureau of Mines
5200	10-3284	Dep.(mc); Bureau of Mines
5214	10-3262	Dep.(mc); Bureau of Mines
BMI (Misc.)		
65	10-2437	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
66	10-3407	Dep.; $0.15(OTS)
72	10-3960	Dep.; $0.25(OTS)
79	10-3809	Dep.; $0.25(OTS)
89	10-3925	Dep.; $0.50(OTS)
97	10-2284	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
237	10-10741	Dep.; $0.35(OTS)
238	10-10742	Dep.; $0.50(OTS)
240	10-10743	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
241	10-10744	Dep.(mc); $1.80(ph OTS); $1.80(ph OTS)
245	10-1209	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
261	10-3785	Dep.; $0.25(OTS)
264	10-669	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
265	10-670	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
269	10-6287	Dep.; $0.65(OTS)
271	10-671	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
272	10-6288	Dep.; $0.20(OTS)
273	10-672	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
274	10-2999	Dep.; $0.65(OTS)
276	10-673	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
277	10-674	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
278	10-675	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
284	10-6591	Dep.; $0.55(OTS)
522	10-2714	Dep.; $0.20(OTS)
550	10-3000	Dep.; $0.30(OTS)
700	10-6370	Dep.; $0.25(OTS)
717	10-3810	Dep.; $0.15(OTS)
718	10-3811	Dep.; $0.20(OTS)
725	10-3194	Dep.; $0.15(OTS)
728	10-3009	Dep.; $0.20(OTS)
730	10-6289	Dep.; $0.15(OTS)
732	10-3812	Dep.; $0.30(OTS)
744	10-2438	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
745	10-3161	Dep.; $0.15(OTS)
746	10-10511	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
751	10-3813	Dep.; $0.20(OTS)
753	10-3885	Dep.; $0.20(OTS)
757	10-3358	Dep.; $0.15(OTS)
766	10-2439	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
776	10-2715	Dep.; $0.30(OTS)
779	10-831	Dep.; $0.15(OTS)
781	10-1367	Dep.; $0.20(OTS)
784	10-832	Dep.; $0.25(OTS)
793	10-2703	Dep.; $0.25(OTS)
798	10-5273	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
809	10-6290	Dep.; $0.15(OTS)
818	10-3814	Dep.; $0.20(OTS)

Report	Abstract	Availability
BMI (Misc.)		
819	10-3356	Dep.; $0.15(OTS)
829	10-3195	Dep.; $0.25(OTS)
832	10-3010	Dep.; $0.15(OTS)
833	10-3359	Dep.; $0.15(OTS)
835	10-3815	Dep.; $0.20(OTS)
849	10-3366	Dep.; $0.15(OTS)
866	10-3816	Dep.; $0.20(OTS)
869	10-6291	Dep.; $0.20(OTS)
870	10-2680	Dep.; $0.15(OTS)
897	10-2681	Dep.; $0.20(OTS)
900	10-2716	Dep.; $0.15(OTS)
928	10-7194	Dep.; $0.25(OTS)
945	10-7195	Dep.; $0.20(OTS)
951	10-2056	Dep.; $0.15(OTS)
957	10-1368	Dep.; $0.25(OTS)
962	10-2022	Dep.; $0.30(OTS)
978	10-55	Dep.(mc); $6.30 (ph OTS); $3.00 (mf OTS)
980	10-1143	Dep.; $0.20(OTS)
987	10-833	Dep.; $0.25(OTS)
997	10-887	Dep.; $0.15(OTS)
1016	10-7315	Dep.; $0.25(OTS)
1017	10-834	Dep.; $0.20(OTS)
1023	10-9793	Dep.; $0.25(OTS)
1026	10-2052	Dep.; $0.35(OTS)
1037	10-176	Dep.; $7.80 (ph OTS); $3.30 (mf OTS)
1041	10-2057	Dep.; $0.20(OTS)
1046	10-3005	Dep.; $0.15(OTS)
1047	10-3006	Dep.; $0.25(OTS)
1052	10-1369	Dep.; $1.80(ph OTS); $1.80(mf OTS).
1067	10-3121	Dep.; $10.80(ph OTS); $3.90(mf OTS)
1083	10-4064	Dep.; $0.20(OTS)
1085	10-4081	Dep.; $0.20(OTS)
1086	10-4065	Dep.; $0.25(OTS)
1092	10-11196	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1097	10-6691	Dep.; $0.20(OTS)
1100	10-6692	Dep.; $0.25(OTS)
1101	10-7698	Dep.; $0.30(OTS)
1102	10-8360	Dep.; $0.35(OTS)
1106	10-8361	Dep.; $0.30(OTS)
1108	10-8326	Dep.; $0.20(OTS)
1110	10-8327	Dep.; $0.25(OTS)
1111	10-9309	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1112	10-9310	Dep.; $0.30(OTS)
1115	10-11157	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1118	10-10161	Dep.; $0.35(OTS)
1120	10-9281	Dep.; $0.25(OTS)
BMI-JDS		
1(27)(Pt. 1)	10-7186	See AECD-4128
1(202) Suppl.	10-7257	See AECD-4127
2(27)	10-7185	See AECD-4126
2(202)	10-9753	See AECD-4141
5	10-7187	See AECD-4139
6	10-7155	See AECD-4138
BMI-JDS		
8	10-7154	See AECD-4137
9	10-6228	See AECD-4136
10	10-8882	See AECD-4135
11	10-8881	See AECD-4134
12(27)	10-8880	See AECD-4133
15	10-7188	See AECD-4140
16	10-9739	See AECD-4132
17	10-8791	See AECD-4131
18	10-8790	See AECD-4130
100	10-10745	Dep.; $0.20(OTS)
101	10-10746	Dep.; $0.25(OTS)
126	10-10747	Dep.; $0.25(OTS)
130	10-10748	Dep.; $0.45(OTS)
136	10-10840	Dep.; $0.40(OTS)
141	10-10749	Dep.; $0.30(OTS)
156	10-10750	Dep.; $0.40(OTS)
194	10-10751	Dep.; $0.65(OTS)
196	10-10787	Dep.; $0.30(OTS)
197	10-10752	Dep.; $0.40(OTS)
201	10-10753	Dep.; $0.55(OTS)
202	10-3787	Dep.; $0.30(OTS)
203	10-10754	Dep.; $0.30(OTS)
214	10-10755	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
232	10-10756	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
BMI-T		
11	10-7255	See AECD-3880
37	10-8878	See AECD-3863
38	10-8861	See AECD-3003(Rev.)
54	10-3385	Dep.; $0.25(OTS)
55	10-3807	Dep.; $0.25(OTS)
BNL		
20	10-2513	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
22	10-2514	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
25	10-3033	Dep.; $0.15(OTS)
62	10-6371	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
69	10-3469	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
86	10-3863	Dep.; $0.25(OTS)
118	10-5126	Dep.; $0.20(OTS)
123	10-3864	Dep.; $0.25(OTS)
126	10-5368	Dep.; $0.20(OTS)
130	10-3386	Dep.; $0.30(OTS)
143	10-2306	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
144	10-11468	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
146	10-2307	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
150	10-11469	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
152	10-3037	Dep.; $0.45(OTS)
156	10-2308	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
158	10-8950	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
178	10-3945	Dep.; $0.50(OTS)
160	10-11470	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
165	10-11471	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
175	10-12016	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)

Report	Abstract	Availability
BNL		
181	10-11472	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
185	10-11473	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
193	10-12017	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
198	10-11474	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
203	10-2053	Dep.; $0.45(OTS)
204	10-11475	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
208	10-11476	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
218	10-11477	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
226	10-11478	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
230	10-11479	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
233	10-11480	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
238	10-11481	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
241	10-12018	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
245	10-11482	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
248	10-11483	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
253	10-11484	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
261	10-11485	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
265	10-7294	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
272	10-11486	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
277	10-11487	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
286	10-12019	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
295	10-12020	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
304	10-12021	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
313	10-12022	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
350	10-3093	Dep.; $1.25(OTS)
354	10-1000	Dep.; $0.15(OTS)
355	10-1	Dep.; $10.80 (ph OTS); $3.90 (mf OTS)
357	10-1030	Dep.; $0.20(OTS)
362	10-948	Dep.; $0.10(OTS)
364	10-3387	Dep.; $0.75(OTS)
367	10-3143	Dep.; $0.40(OTS)
370	10-3154	Dep.; $0.20(OTS)
375	10-3891	Dep.; $0.40(OTS)
378	10-4918	Nucleonics 14, No. 8, 100-1(1956); Dep.; $0.25(OTS)
379	10-3373	Dep.; $0.10(OTS)
384	10-3968	Dep.; $0.15(OTS)
386	10-4919	Dep.; $0.15(OTS)
388	10-6749	Dep.; $0.40(OTS)
389	10-5560	Dep.; $0.25(OTS)
390	10-11580	Dep.; $0.35(OTS)
395	10-6658	Dep.; $0.15(OTS)
400	10-10415	Dep.; $0.50(OTS)
407	10-11592	Dep.; $0.15(OTS)
1072	10-10917	Dep.; $0.15(OTS)
1149	10-3388	Dep.; $0.20(OTS)
1150	10-3865	Dep.; $0.20(OTS)
1151	10-3389	Dep.; $0.15(OTS)
1152	10-2515	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1328	10-3406	Dep.; $0.45(OTS)
1339	10-3390	Dep.; $0.15(OTS)
1344	10-4920	Dep.; $0.25(OTS)
1357	10-6445	Dep.; $0.20(OTS)
1365	10-2552	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1574	10-2489	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1577	10-2562	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1578	10-6372	Dep.; $0.15(OTS)
1579	10-2516	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1580	10-10918	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1581	10-6373	Dep.; $0.25(OTS)
1602	10-2517	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1627	10-3038	Dep.; $0.20(OTS)
1690	10-3886	Dep.; $0.15(OTS)
1779	10-3039	Dep.; $0.20(OTS)
1782	10-5369	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1783	10-3227	Dep.; $0.30(OTS)
1785	10-3391	Dep.; $0.15(OTS)
1795	10-6374	Dep.; $0.20(OTS)
1796	10-3228	Dep.; $0.25(OTS)
1797	10-7295	Dep.; $0.30(OTS)
1798	10-2440	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1812	10-3229	Dep.; $0.15(OTS)
1814	10-2518	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1986	10-3145	Dep.; $0.15(OTS)
1987	10-3946	Dep.; $0.30(OTS)
1992	10-3866	Dep.; $0.15(OTS)
2016	10-3392	Dep.; $0.15(OTS)
2019	10-3393	Dep.; $0.20(OTS)
2020	10-3867	Dep.; $0.25(OTS)
2021	10-3394	Dep.; $0.20(OTS)
2022	10-3319	Dep.; $0.20(OTS)
2023	10-3395	Dep.; $0.15(OTS)
2024	10-3396	Dep.; $0.15(OTS)
2025	10-3868	Dep.; $0.15(OTS)
2026	10-3879	Dep.; $0.20(OTS)
2027	10-3397	Dep.; $0.15(OTS)
2028	10-3376	Dep.; $0.20(OTS)
2054	10-2606	Anat. Record 120, 772-3(1954)
2067	10-51	J. Gen. Physiol. 39, 31-53(1955)
2067A	10-52	J. Gen. Physiol. 39, 55-67(1955)
2094	10-4062	Dep.; $0.40(OTS)
2108	10-315	J. Inorg. and Nuclear Chem. 1, 253(1955)
2119	10-3869	Dep.; $0.30(OTS)
2133	10-5501	J. Exptl. Zool. 130, 341-52(1955)
2158	10-3743	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2164	10-1157	Growth 19, 215-44(1955)
2172	10-170	Nature 176, 299-301(1955)
2173	10-1612	J. Chem. Phys. 23, 2060-5(1955)
2174	10-1613	J. Chem. Phys. 23, 2066-8(1955)
2180	10-2607	Exptl. Cell Research 9, 474-88(1955)
2183	10-644	Dep.; $0.15(OTS)
2184	10-3398	Dep.; $0.15(OTS)
2185	10-5558	J. Am. Chem. Soc. 77, 5999-6002(1955)
2192	10-2111	J. Chem. Phys. 23, 2264-7(1955)
2194	10-2174	Phys. Rev. 100, 1302-8(1955)

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BNL		
2227	10-1834	Acta Met. 3, 549-57(1955)
2229	10-1463	Dep.; $0.10(OTS)
2232	10-9914	The AUK 73, 153-75(1956)
2239	10-557	Exptl. Parasitol. 4, 435-44(1955)
2243	10-2653	J. Chem. Phys. 24, 24-32(1956)
2245	10-4492	Radiation Research 4, 42-8(1956)
2247	10-8	J. Immunol. 75, 203-8(1955)
2259	10-2654	J. Chem. Phys. 24, 56-9(1956)
2260	10-30	Radiation Research 3, 116-20(1955)
2265	10-2039	J. Chem. Phys. 23, 2322-6(1955)
2266	10-1192	Nature 176, 306(1955)
2271	10-2636	J. Biol. Chem. 217, 61-6(1955)
2272	10-1195	Radiation Research 3, 316-30(1955)
2273	10-49	J. Pharmacol. Expt. Therap. 114, 484-9 (1955)
2274	10-1758	Nature 176, 831(1955)
2279	10-10008	J. Cellular Comp. Physiol. 47, Suppl. 1, 217-34(1956)
2285	10-1105	Nucleonics 13, No. 11, 110-12(1955)
2290	10-4514	Circulation 12, 1043-6(1955)
2295	10-2673	J. Bacteriol. 70, 572-6(1955)
2297	10-2652	J. Chem. Phys. 24, 16-23(1956)
2299-R	10-8195	J. Am. Chem. Soc. 78, 860-1(1956)
2306	10-1980	Am. J. Physiol. 183, 125-36(1955)
2309	10-1252	Anal. Chem. 27, 1935-9(1955)
2310	10-1253	Anal. Chem. 27, 1939-41(1955)
2314	10-6022	J. Chem. Phys. 24, 184-90(1956)
2316	10-8135	Poultry Sci. 34, 1437-40(1955)
2339	10-4547	J. Polymer Sci. 19, 73-5(1956)
2342	10-394	Phys. Rev. 100, 32-6(1955)
2349	10-349	Phys. Rev. 100, 74-80(1955)
2350	10-450	Phys. Rev. 100, 81-2(1955)
2351	10-2640	Geochim. et Cosmochim. Acta 8, 281-4 (1955)
2352	10-9035	Plant Physiol. 30, 463-7(1955)
2353	10-5460	Plant Disease Reptr. 39, 572(1955)
2354	10-1979	J. Biol. Phot. Assoc. 23, Nos. 2 & 3, 74-7(1955)
2358	10-8456	J. Appl. Phys. 26, 1182-3(1955)
2359	10-1260	Nucleonics 13, No. 12, 62(1955)
2365	10-9674	pp. 143-8 in Proceedings of the Conferences on Carbon, Univ. of Buffalo, New York, 1956
2372	10-1274	J. Am. Chem. Soc. 77, 5852-5(1955)
2376	10-8316	J. Biol. Chem. 219, 719-25(1956)
2380	10-362	Phys. Rev. 100, 306-23(1955)
2383	10-2519	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2384	10-2520	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2385	10-1548	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2386	10-1549	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2388	10-2327	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2389	10-2201	Phys. Rev. 100, 1334-8(1955)
2390	10-3399	Dep.; $0.15(OTS)
2391	10-6375	Dep.; $0.15(OTS)
2392	10-2521	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2393	10-3679	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2394	10-3400	Dep.; $0.10(OTS)
2395	10-3146	Dep.; $0.25(OTS)
2396	10-3345	Dep.; $0.15(OTS)
2397	10-1550	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2398	10-5370	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2399	10-2328	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2400	10-9931	Progress in Radiobiology, Pp. 485-8, London, Oliver and Boyd, 1956
2401	10-1635	Phys. Rev. 100, 1013-14(1955)
2402	10-2132	Phys. Rev. 100, 1487-9(1955)
2405	10-4479	Am. Naturalist 89, 369-70(1955)
2408	10-1593	Phys. Rev. 100, 886-90(1955)
2412	10-11029	J. Clin. Invest. 35, 831-6(1956)
2413	10-9699	J. Chem. Phys. 24, 1211-12(1956)
2414	10-9700	J. Chem. Phys. 24, 1213-19(1956)
2416	10-8305	J. Inorg. and Nuclear Chem. 2, 180-3(1956)
2419	10-8145	Phytopathology 46, 177-8(1956)
2422	10-282	Phys. Rev. 100, 324-7(1955)
2428	10-2175	Phys. Rev. 100, 1309-14(1955)
2434	10-7588	J. Phys. Chem. 60, 500-1(1956)
2437	10-1566	Nucleonics 13, No. 12, 64-8(1955)
2441	10-8302	J. Chem. Phys. 24, 993-5(1956)
2442	10-5572	J. Phys. Chem. 60, 237-9(1956)
2443	10-5491	Am. J. Roentgenol. Radium Therapy Nuclear Med. 75, 609-18(1956)
2445	10-2151	Phys. Rev. 100, 1338-9(1955)
2446	10-2054	Dep.; $1.00(OTS)
2450	10-3251	Dep.; $1.80(ph OTS); $1.80(mf OTS)
2448	10-4478	Proc. Soc. Exptl. Biol. Med. 90, 571-4(1955)
2449	10-4958	Phys. Rev. 101, 388-97(1956)
2451	10-6599	A.I.Ch.E. Journal 2, 163-8(1956)
2452	10-8499	Phys. Rev. 100, 745-6(1955)
2453	10-519	Nucleonics 13, No. 11, 128-9(1955)
2457	10-2141	Phys. Rev. 100, 1414-18(1955)
2458	10-2202	Phys. Rev. 100, 1357-63(1955)
2460	10-1634	Phys. Rev. 100, 935-6(1955)
2461	10-9932	Am. J. Botany 43, 377-88(1956)
2464	10-9515	Nucleonics 14, No. 5, 108, 109, and 110-11(1956)
2465	10-2884	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2466	10-4837	Phys. Rev. 101, 433-8(1956)
2467	10-5840	Phys. Rev. 101, 967-71(1956)
2468	10-5930	Phys. Rev. 101, 726(1956)
2470	10-8684	Phys. Rev. 102, 242(1956)
2472	10-4832	Phys. Rev. 101, 384-7(1956)
2477	10-2125	Rev. Sci. Instr. 26, 1208-9(1955)
2487	10-8570	Phys. Rev. 102, 489-94(1956)

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BNL		
2491	10-2122	Rev. Sci. Instr. 26, 1201-2(1955)
2493	10-8571	Phys. Rev. 102, 495-501(1956)
2498	10-4477	Proc. Soc. Exptl. Biol. Med. 90, 470-3(1955)
2500	10-7545	J. Phys. Chem. 60, 381-2(1956)
2501	10-1530	Phys. Rev. 100, 943-4(1955)
2502	10-2843	Rev. Sci. Instr. 27, 26-34(1956)
2503	10-2136	Phys. Rev. 100, 1540-1(1955)
2504	10-5928	Phys. Rev. 101, 673-84(1956)
2507	10-11615	Can. J. Agr. Sci. 36, 120-6(1956)
2510	10-7054	J. Appl. Phys. 27, 610-16(1956)
2512	10-7580	J. Am. Chem. Soc. 78, 911-13(1956)
2517	10-8069	J. Chem. Phys. 24, 617(1956)
2520	10-5939	Phys. Rev. 101, 1034-8(1956)
2521	10-5467	Proc. Natl. Acad. Sci. U. S. 42, 78-84(1956)
2522	10-2925	Phys. Rev. 100, 1787-8(1955)
2523	10-5872	Phys. Rev. 101, 1127-30(1956)
2527	10-9949	Radiation Research 5, 25-38(1956)
2528	10-9202	J. Am. Chem. Soc. 78, 2354-8(1956)
2529	10-11023	Endocrinology 59, 55-68(1956)
2530	10-10013	J. Biol. Chem. 221, 469-76(1956)
2532	10-4497	Nucleonics 14, 26-9(1956)
2542	10-6916	Phys. Rev. 101, 1547-51(1956)
2543	10-1330	Nucleonics 13, No. 12, 27-9(1955)
2544	10-11037	J. Bacteriol. 72, 65-7(1956)
2546	10-11603	J. Comp. Pethol. 66, 217-27(1956)
2550	10-9712	Phys. Rev. 102, 981-92(1956)
2551	10-7068	Phys. Rev. 101, 1485-92(1956)
2552	10-11795	Non-Destructive Testing 14, No. 4, 16-17 & 25(1956)
2557	10-11851	Acta Met. 4, No. 2, 215-17(1956)
2558	10-7038	Phys. Rev. 101, 1508-14(1956)
2560	10-8134	J. Cellular Comp. Physiol. 47, 147-66(1956)
2562	10-3095	Dep.(mc); $3.20(ph OTS); $2.40(mf OTS)
2563	10-6455	Nucleonics 14, No. 6, 98-102(1956)
2572	10-11570	Anal. Chem. 28, 1472-4(1956)
2576	10-8639	Phys. Rev. 102, 396-9(1956)
2584	10-9558	Phys. Rev. 102, 731-2(1956)
2585	10-11970	Dep.; $0.40(OTS)
2595	10-6583	J. Am. Chem. Soc. 78, 2939-43(1956)
2618	10-11500	Nuclear Sci. and Eng. 1, 135-55(1956)
2619	10-9589	Phys. Rev. 102, 1364-5(1956)
2621	10-9969	Radiation Research 5, 58-64(1956)
2624	10-10061	J. Am. Chem. Soc. 78, 3246-52(1956)
2626	10-7925	Phys. Rev. 101, 1828(1956)
2629	10-11038	J. Bacteriol. 72, 259-68(1956)
2630	10-8572	Phys. Rev. 102, 502-15(1956)
2634	10-10038	Anal. Chem. 28, 1345-7(1956)
2638	10-9684	Phys. Rev. 102, 761-5(1956)
2641	10-9115	Proc. Soc. Exptl. Biol. Med. 91, 443-6 (1956)
2642	10-9034	Endocrinology 58, 347-51(1956)
2644	10-9061	Proc. Natl. Acad. Sci. U. S. 42, 239-45 (1956)
2646	10-9062	Proc. Soc. Exptl. Biol. Med. 91, 630-2 (1956)
2683	10-11365	Rev. Sci. Instr. 27, 628-30(1956)
2695	10-10622	Phys. Rev. 103, 211-25(1956)
2699	10-7007	Phys. Rev. 102, 1557-9(1956)
2706	10-10331	I.R.E. Trans. Nuclear Sci. NS-3, 15-17 (1956)
2713	10-10666	Dep.; $4.80(ph OTS); $2.70(mf OTS)
2714	10-11433	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2741	10-10919	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2742	10-9832	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2744	10-10920	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2745	10-10921	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2746	10-10922	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2753	10-11588	Am. J. Phys. 24, 433-44(1956)
2760	10-7893	Nucleonics 14, No. 4, 38-9(1956)
BP		
13	10-3560	See M-2142
20	10-4151	See A-2586
22	10-2311	See A-2588
29	10-3620	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
35	10-2313	See A-3552
45	10-10826	See NNES-I-1 (Chap.6)
60	10-2458	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
63	10-2463	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
97	10-5084	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
BT		
3	10-8828	See M-884
4	10-5092	See A-213
8	10-3528	See AECD-3867
11	10-6237	See M-1060
15	10-5216	See M-887
22	10-2360	See A-726
38	10-4159	See A-1099
39	10-4210	See A-2300
40	10-4135	See A-2301
47	10-4160	See A-2308
48	10-5188	See A-2309
52	10-5189	See A-2313
53	10-2364	See A-2314
55	10-7174	See A-2316
58	10-5190	See A-2319
60	10-2365	See A-2321
61	10-5191	See A-2322
62	10-5192	See A-2323
63	10-5193	See A-2324
64	10-5194	See A-2325
66	10-5195	See A-2327
68(Pt. 2)	10-9737	See A-2329(Pt. II)
68(Pts.3 & 4)	10-4211	See A-2329(Pts. III and IV)

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C		
0.320.2	10-6166	See AECD-4153
0.320.5	10-7191	See AECD-4184
0.320.6	10-8797	See AECD-4175
0.350.4	10-3537	See AECD-3937
0.350.9	10-8820	See AECD-4125
0.350.11	10-8823	See AECD-4192
0.350.14	10-8822	See AECD-4179
0.350.18	10-8762	See AECD-4174
0.350.24	10-4222	See AECD-3956
0.355.3	10-9742	See AECD-4163
0.360.1	10-6316	See AECD-4119
0.360.6	10-8765	See AECD-4189
0.365.1	10-4219	See AECD-3936
0.375.2	10-5199	See AECD-3858
0.375.5	10-7181	See AECD-4103
0.375.6	10-7192	See AECD-4188
0.380.1	10-3590	See AECD-3951
0.380.2	10-9787	See AECD-4177
0.380.4	10-8819	See AECD-4110
0.380.5	10-7153	See AECD-4102
0.380.6	10-4286	See AECD-3857
0.380.7	10-10740	See AECD-4181
0.380.8	10-3536	See AECD-3935
1.360.2	10-7128	See AECD-4202
1.360.3	10-8763	See AECD-4180
1.360.4	10-8764	See AECD-4186
1.360.5	10-6123	See AECD-4124
1.360.9	10-6122	See AECD-4090
1.365.1	10-9738	See AECD-4117
1.365.5	10-3543	See AECD-3955
1.385.1	10-8824	See AECD-4193
2.320.4	10-7184	See AECD-4111
2.340.2	10-7283	See AECD-4099
2.350.3	10-4218	See AECD-3933
2.350.7	10-6165	See AECD-4120
2.350.9	10-5202	See AECD-3918
2.355.1	10-3534	See AECD-3917
2.355.2	10-3542	See AECD-3954
2.355.3	10-3546	See AECD-3965
2.375.2	10-6223	See AECD-4112
2.381.4	10-3529	See AECD-3875
3.320.3	10-8793	See AECD-4159
3.320.5	10-8794	See AECD-4160
3.360.8	10-9726	See AECD-4194
3.360.9	10-8760	See AECD-4161
3.365.1	10-8798	See AECD-4203
3.370.8	10-5260	See AECD-3962
3.375.3	10-4161	See AECD-3934
3.385.1	10-5203	See AECD-3961
4.360.2	10-3541	See AECD-3953
4.360.9	10-3535	See AECD-3932
4.381.5	10-7190	See AECD-4155
5.350.3	10-3539	See AECD-3947
5.350.5	10-3540	See AECD-3952
5.350.6	10-3545	See AECD-3960
5.350.8	10-8932	See AECD-4187
5.355.7	10-8821	See AECD-4178
5.355.8	10-6317	See AECD-4121
5.355.10	10-4224	See AECD-3963
15	10-6261	See AECD-3872
88	10-2563	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
192	10-3680	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
CC		
264	10-3483	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
355	10-5207	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
648	10-4155	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1201	10-5208	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1321	10-3480	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1366	10-2377	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1383	10-3681	Dep.(mc); $13.80(ph OTS); $2.40(mf OTS)
1432	10-2285	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1500	10-5097	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1517	10-5109	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1606	10-6138	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1607	10-6450	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1631	10-4464	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1706	10-10019	Dep.; $0.50(OTS)
1915	10-6139	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1925	10-10983	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1974	10-11775	Dep.; $0.25(OTS)
2009	10-1288	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2095	10-4226	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2105	10-5209	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2123	10-3618	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2319	10-4463	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2400	10-3598	See M-4585
2401	10-3484	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2403	10-3427	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2522	10-3755	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2626	10-6168	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2636	10-4164	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2664	10-5257	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2670	10-3428	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2715	10-3598	See M-4585
2723	10-4152	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2730	10-4227	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2800(Del.)	10-10733	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2871	10-9736	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2933	10-3429	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2934	10-5110	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2941	10-5111	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2947	10-5123	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2957	10-2378	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2962	10-3485	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2994	10-3430	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

Report	Abstract	Availability
CC		
3017	10-10757	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3069	10-3415	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3161	10-3470	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3241	10-3431	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS
3244	10-5112	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3302	10-3548	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3336	10-3549	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3386	10-8783	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3424	10-4228	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3489	10-744	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3524	10-5258	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3618	10-5210	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3623	10-6169	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3625	10-7157	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3638	10-3432	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
CD		
185-285	10-5204	See AECD-3970
454	10-1317	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
490	10-7156	See AECD-4176
496	10-6224	See AECD-4114
564-CEL-A	10-3527	See AECD-3854
954-14	10-3481	See AECD-3859
2228	10-4214	See AECD-3853
3801 (Rev.)	10-10704	See AECD-3944
4003	10-3530	See AECD-3897
4005	10-3538	See AECD-3945
4006	10-5201	See AECD-3899
4016	10-3544	See AECD-3959
4022	10-8825	See AECD-4205
4023	10-4223	See AECD-3957
4030	10-7126	See AECD-4156
4033	10-4220	See AECD-3946
4103	10-8795	See AECD-4165
4105	10-6221	See AECD-4087
5560	10-3592	See AECD-3896
CD-BETA-S		
517	10-9754	See AECD-4183
CD-ChemS		
564	10-4217	See AECD-3919
567	10-5200	See AECD-3898
CD-GS		
19	10-7189	See AECD-4152
36	10-8792	See AECD-4151
37	10-4221	See AECD-3950
39	10-7151	See AECD-4204
CD-MPR		
17	10-8796	See AECD-4166
CD-PPO		
14	10-7193	See AECD-4206

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CE		
288	10-5371	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
364	10-3471	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
481	10-5372	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
501	10-10923	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
805	10-3682	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
951	10-6376	Dep.; $0.15(OTS)
1074	10-2522	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1132	10-3683	Dep.(mc); $19.80(ph OTS); $6.30(mf OTS)
1149	10-3684	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
1150	10-3685	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1391	10-9833	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1439	10-8951	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2532	10-6252	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2567	10-8952	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2577	10-8953	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2674	10-9762	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3503	10-10811	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
CF (Argonne National Lab.)		
863	10-3646	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1627	10-4470	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2773	10-8936	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3067	10-7316	Dep.; $0.15(OTS)
3341	10-3707	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3562	10-9834	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3746	10-8954	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
CF (Columbia Univ.)		
338	10-3757	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
CF (ORNL)		
45-2-1	10-3732	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
45-6-144	10-2286	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
46-6-23	10-3686	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
47-1-41	10-6377	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
47-1-42	10-5333	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
47-2-36	10-10924	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
47-4-34	10-3687	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
47-4-115	10-4375	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
47-8-240	10-2245	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
47-9-305	10-2523	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
47-9-370	10-2541	See M-4128
47-11-13	10-9835	Dep.; $0.30(OTS)
47-11-33	10-4461	See M-4204
47-12-58	10-2450	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
48-2-139	10-3688	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
48-3-264	10-6378	Dep.; $0.20(OTS)
48-6-34	10-10866	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
48-7-48	10-7317	Dep.; $1.80(ph OTS)
48-7-312	10-8955	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
48-8-48	10-6422	See ORNL-548
48-8-328	10-2549	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
48-8-348	10-6379	Dep.(mc); $1.80(ph OTS); $2.40(mf OTS)
48-9-126	10-6380	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

Report	Abstract	Availability
CF (ORNL)		
48-9-128	10-2564	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
48-10-219	10-3433	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
48-12-101	10-10925	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
49-1-65	10-4376	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
49-1-193	10-2524	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
49-1-238	10-2525	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-1-281	10-8956	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
49-4-123	10-2526	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
49-8-97	10-6424	See ORNL-728
49-9-69	10-2527	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-11-48	10-3689	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-11-152	10-9836	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-11-180	10-6381	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-11-217	10-2528	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
49-11-226	10-2529	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-11-273	10-5373	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
49-12-1	10-3690	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-12-18	10-3691	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
49-12-30	10-3692	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
49-12-44	10-5427	See ORNL-636
49-12-48	10-3693	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
49-12-50	10-5374	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-12-82	10-3694	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-12-83	10-3695	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
49-12-84	10-6382	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-1-20	10-10727	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-1-45	10-2558	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
50-1-125	10-4377	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
50-1-157	10-2559	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-2-19	10-5375	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
50-2-38	10-6440	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-2-108	10-8817	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
50-3-43	10-9022	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50-3-102	10-4378	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
50-4-3	10-4379	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-4-17	10-3696	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-4-83	10-10926	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-4-98	10-8957	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50-4-110	10-3924	See AECD-3722
50-4-115	10-8958	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50-4-148	10-3697	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-5-81	10-8862	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50-5-140	10-3698	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
50-6-9	10-5253	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-6-25	10-4380	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-6-208	10-8863	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-7-125	10-4381	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50-7-173	10-9837	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-8-17	10-5424	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50-8-49	10-4382	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-8-65	10-9896	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-8-85(Rev.)	10-2560	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-8-98	10-6446	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-8-116	10-4383	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-9-139	10-3699	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
CF (ORNL)		
50-11-41	10-4384	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
50-12-25	10-4360	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-12-86	10-9838	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
50-12-104	10-8959	Dep.; $0.30(OTS)
51-1-6	10-9839	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-1-97	10-8960	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-2-102	10-3550	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-4-110	10-4385	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-4-156	10-4386	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-4-174	10-4165	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-5-12	10-9840	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-5-37	10-9781	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-5-61	10-4387	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-5-62	10-4388	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-5-72	10-4389	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-5-73	10-4390	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-5-98	10-7318	Dep.; $1.25(OTS)
51-5-164	10-7319	Dep.; $0.30(OTS)
51-5-170	10-4337	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-5-182	10-4459	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-5-190	10-8864	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-5-193	10-6308	Dep.; $0.70(OTS)
51-5-199	10-8961	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-5-207	10-4123	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-6-42	10-9841	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
51-6-9	10-4391	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
51-6-91	10-2338	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-7-106	10-3700	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-7-114	10-8962	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-7-116	10-10841	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-7-120	10-3486	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
51-7-149	10-4166	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-8-31	10-9842	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-8-48	10-8963	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-8-151	10-4392	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-8-216	10-9843	Dep.; $0.25(OTS)
51-8-256	10-4289	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
51-8-266	10-10927	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
51-9-40	10-9782	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
51-9-63	10-2246	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-9-70	10-9844	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-9-112	10-2530	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-10-21	10-8847	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-10-28	10-3487	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-10-33	10-8964	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-10-97	10-3475	Dep.; $21.30(ph OTS); $6.90(mf OTS)
51-10-100	10-8865	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-10-106	10-10988	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-10-107	10-9845	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-10-130	10-9766	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
51-10-149	10-8800	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
51-11-5	10-6314	See ORO-118
51-11-44	10-3551	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-11-59	10-4393	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-11-92	10-5376	Dep.; $0.15(OTS)

Report	Abstract	Availability
CF (ORNL)		
51-11-123	10-4253	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-11-130	10-9846	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-11-149	10-4394	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
51-11-186	10-4268	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-11-196	10-8866	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
51-12-1	10-2531	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51-12-67	10-3552	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
51-12-73	10-9847	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-1-30	10-4167	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-1-62	10-4395	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-1-77	10-8965	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-1-124	10-4229	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-1-160	10-4396	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-1-180	10-9848	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-1-209	10-10928	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-2-20	10-8966	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-2-37	10-4397	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-2-55	10-3645	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-2-72	10-2287	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-2-78	10-8967	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-2-164	10-3488	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-2-217	10-2329	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-2-232	10-3701	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-3-32	10-8867	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-3-34	10-2396	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-3-123	10-8855	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-3-134	10-2532	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-3-143	10-10698	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-3-151	10-4168	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-3-155	10-2321	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-3-195	10-7320	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-3-253	10-10788	Dep.(mc);$3.30(ph OTS); $2.40(mf OTS)
52-4-37	10-10812	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-4-39	10-2533	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-4-87	10-10900	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-4-157	10-2561	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-5-142	10-4169	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-5-211	10-2553	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-5-230	10-7321	Dep.; $0.15(OTS)
52-6-33	10-3606	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-6-67	10-3018	Dep.; $0.15(OTS)
52-6-118	10-8968	Dep.; $0.20(OTS)
52-6-164	10-10758	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-6-165	10-4398	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-7-126	10-4399	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-7-132	10-10759	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-7-165	10-5067	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-7-167	10-4583	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-8-31	10-4400	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-8-140	10-10805	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-8-162	10-6230	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-8-223	10-4922	Dep.(mc); $4.80(ph OTS); 2.70(mf OTS)
52-9-59	10-4623	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-9-75	10-3702	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-9-197	10-10929	Dep.; $0.15(OTS)
52-10-9	10-4343	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-10-38	10-9849	Dep.; $0.10(OTS)
52-10-81	10-6383	Dep.; $0.15(OTS)
52-10-107	10-4932	See ORNL-1894
52-10-134	10-10930	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-10-181	10-10931	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-11-7	10-4290	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-11-18	10-10932	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-11-121	10-10842	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-11-240	10-10984	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-12-34	10-5425	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
52-12-70	10-9850	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
52-12-118	10-2534	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
52-12-145	10-6384	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53-1-140	10-9851	Dep.; $0.20(OTS)
53-1-230	10-9852	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-1-247	10-8969	Dep.(mc); $3.30(ph OTS) ; $2.40(mf OTS)
53-1-248	10-8919	Dep.(mc); $3.30(ph OTS-; $2.40(mf OTS)
53-1-253	10-9853	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-1-283	10-3489	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-2-76	10-10933	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-2-93	10-10934	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-2-99	10-4465	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-2-112	10-8970	Dep.; $0.15(OTS)
53-2-134	10-5377	Dep.; $0.25(OTS)
53-3-36	10-9819	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-3-125	10-6385	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-3-166	10-6342	Dep.; $0.10(OTS)
53-4-23	10-8971	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-4-48	10-2535	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-4-113	10-4588	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
53-5-102	10-8857	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-5-105	10-3859	See AECD-3720
53-5-125	10-10935	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-5-139	10-3382	See AECD-3716
53-5-172	10-6520	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-5-211	10-4401	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-5-228	10-10706	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-6-1(Rev.)	10-4999	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-6-162	10-8972	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53-6-224	10-10977	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-7-29	10-10936	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-7-198	10-10806	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-7-205	10-10937	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-7-221	10-4402	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53-7-225	10-8848	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53-8-30	10-8759	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-8-40	10-10896	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-8-43	10-8849	Dep.; $0.40(OTS)
53-8-77	10-8973	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53-8-173	10-9743	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-9-1	10-9854	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-9-20	10-8868	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-9-33	10-6386	Dep.; $0.35(OTS)

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CF (ORNL)		
53-9-49	10-8891	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-9-75	10-6387	Dep.; $0.25(OTS)
53-9-96	10-3756	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53-9-110	10-8801	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-9-134	10-3703	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-9-169	10-9855	Dep.; $0.25(OTS)
53-9-191	10-9808	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-9-199	10-9775	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-10-4	10-8802	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-10-7	10-10911	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-10-73	10-5378	Dep.; $0.20(OTS)
53-10-86	10-4568	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-10-198	10-10807	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-11-62	10-9856	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53-11-64	10-10989	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
53-12-31	10-9783	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-12-94	10-6258	Dep.; $0.25(OTS)
53-12-108	10-6388	Dep.; $0.15(OTS)
53-12-117	10-9729	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
53-12-126	10-4923	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
54-1-1	10-10938	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-1-31	10-10897	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
54-1-80	10-9857	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-1-104	10-3383	See AECD-3719
54-1-122	10-10734	Dep.; $0.30(OTS)
54-2-37	10-8850	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-2-72	10-9858	Dep.; $0.15(OTS)
54-2-92	10-10978	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
54-2-159	10-3666	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-2-165	10-9859	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-2-179	10-4170	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-3-22	10-9773	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-3-57	10-9860	Dep.; $0.30(OTS)
54-3-67	10-10813	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-3-120	10-6389	Dep.; $0.20(OTS)
54-3-126	10-9861	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-3-164	10-10939	Dep.; $0.15(OTS)
54-3-169	10-9862	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-3-171	10-3607	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
54-3-175	10-3704	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-4-17	10-10901	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-4-30	10-9863	Dep.; $0.15(OTS)
55-4-36	10-11805	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-4-114	10-8974	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-4-142	10-4347	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-4-170	10-7322	Dep.; $0.30(OTS)
54-4-171	10-9864	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-4-182	10-6390	Dep.; $0.25(OTS)
54-4-203	10-4403	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-4-205	10-8851	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-4-216	10-8975	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-4-217	10-10789	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-4-228	10-9865	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-5-6	10-10940	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-5-59	10-9725	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-5-159	10-8976	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-5-164	10-9866	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-5-170	10-7323	Dep.; $0.15(OTS)
54-5-188	10-4404	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-5-197	10-9867	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-5-200	10-3744	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-6-74	10-9868	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-6-78	10-9869	Dep.; $0.15(OTS)
54-6-165	10-4405	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-6-180	10-6391	Dep.; $0.15(OTS)
54-6-184	10-9870	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-6-200	10-7324	Dep.; $0.15(OTS)
54-6-232	10-11488	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-6-248	10-10184	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-6-258	10-6231	Dep.; $0.15(OTS)
54-7-34	10-8977	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-7-38	10-8655	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-7-64	10-9871	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-7-88(Pt.I)	10-8978	Dep.; $0.50(OTS)
54-7-88(Pt. II)	10-7980	Dep.; $2.20(OTS)
54-7-95	10-5379	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-7-105	10-7325	Dep.; $0.20(OTS)
54-7-122	10-9872	Dep.; $0.25(OTS)
54-7-136	10-8979	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-7-158	10-4406	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-8-10(Del.)	10-8908	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-8-26	10-8980	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-8-96	10-9890	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-8-97	10-7296	Dep.; $0.15(OTS)
54-8-98	10-5334	Dep.; $0.10(OTS)
54-8-102	10-10941	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-8-104	10-4844	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-8-179	10-5380	Dep.; $0.15(OTS)
54-8-226	10-9015	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-8-232	10-10942	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-9-13	10-10790	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-9-16	10-10707	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-9-30	10-10943	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-9-97	10-6392	Dep.; $0.15(OTS)
54-9-114	10-4407	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-9-120	10-7353	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-9-143	10-8981	Dep.; $0.20(OTS)
54-10-86	10-4569	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-10-111	10-4924	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
54-10-113	10-6348	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-10-146	10-6393	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
54-10-176	10-7326	Dep.; $0.15(OTS)
54-11-3	10-6349	Dep.; $0.20(OTS)
54-11-15	10-3805	See AECD-3717
54-11-37	10-8852	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
54-11-63	10-5592	Dep.(mc); $7.30(ph OTS); $3.30(mf OTS)
54-11-83	10-4966	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
54-11-178	10-4876	J. Nuclear Energy 2, 118-27(1955)
54-12-57	10-8982	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
54-12-78	10-3909	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

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CF (ORNL)		
54-12-100	10-8983	Dep.; $0.30(OTS)
54-12-143	10-3705	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-1-3	10-9873	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-1-20	10-8280	Dep.; $0.75(OTS)
55-1-76	10-4925	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
55-1-104	10-4589	Dep.(mc); $3.80(ph OTS); $2.40(mf OTS)
55-1-120	10-3706	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-1-200	10-4581	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-2-51	10-10725	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-2-74	10-9874	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-2-146	10-9744	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-3-70	10-10985	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-3-84	10-10512	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-3-110	10-4570	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-3-119	10-9767	Dep.; $0.30(OTS)
55-3-128	10-10827	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-3-193	10-4571	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-4-34	10-10808	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-4-104	10-3956	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-4-124	10-10814	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-4-140	10-10513	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-5-2	10-8934	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-5-125	10-10514	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-5-126	10-9823	Dep.; $0.65(OTS)
55-5-149	10-8926	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-5-166	10-9875	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-5-171	10-4582	Dep.; $3.30(ph OTS); $2.40(mf OTS)
55-5-200	10-9768	Dep.; $0.50(OTS)
55-6-13	10-6292	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-6-24	10-10832	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-6-43	10-5423	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-6-108	10-10944	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-6-144	10-4866	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-6-148	10-3947	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-6-152	10-11778	Dep.; $0.15(OTS)
55-7-9	10-10898	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-7-16	10-10708	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-7-52	10-4590	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-7-67	10-8984	Dep.; $0.30(OTS)
55-7-122	10-10515	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
55-7-130	10-4926	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-8-58	10-9822	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-8-73	10-10979	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-8-95	10-8985	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-8-170	10-10843	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-8-183	10-10516	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
55-8-201	10-5961	Dep.; $1.00(OTS)
55-9-55	10-9745	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
55-9-65	10-10162	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-9-73	10-4865	Nuclear Sci. and Eng. 1, 68-9(1956); Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-9-74	10-4855	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-9-108	10-4967	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-9-151	10-10517	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-9-163	10-9016	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-9-168(Rev.)	10-8935	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-9-172	10-9876	Dep.; $0.20(OTS)
55-10-7	10-8853	Dep.; $0.20(OTS)
55-10-17	10-8986	Dep.; $0.15(OTS)
55-10-19	10-10945	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
55-10-34	10-10815	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-10-45	10-9877	Dep.; $0.25(OTS)
55-10-46	10-10760	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-10-61	10-10864	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-10-66	10-10761	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-10-73	10-10881	Dep.; $0.25 (OTS)
55-10-81	10-9735	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-10-95	10-8927	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-10-119	10-10809	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-11-30	10-10762	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-11-35	10-7327	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-11-42	10-7328	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-11-62	10-7329	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-11-104	10-9812	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-11-143	10-7234	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-11-151	10-10914	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-11-166	10-8987	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
55-12-22	10-7248	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-12-32	10-11806	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-12-50	10-10946	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-12-72	10-9764	Dep.(mc); $6.30(ph OTS); $5.00(mf OTS)
55-12-77	10-8869	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
55-12-97	10-8988	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55-12-98	10-8909	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-12-112	10-10763	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55-12-118	10-11163	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
55-12-121	10-10313	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-1-31	10-4031	Dep.; $1.80(ph OTS); $1.80(mf OTS)
56-1-86	10-4083	Dep.; $1.80(ph OTS); $1.80(mf OTS)
56-1-94	10-3325	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-1-106	10-4114	Dep.; $3.30(ph OTS); $2.40(mf OTS)
56-1-130	10-3266	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-1-162	10-3248	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-1-168	10-5626	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
56-2-33	10-4033	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-2-42	10-10518	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-2-78	10-3219	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-2-79	10-3312	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-2-90	10-3279	Dep.; $1.80(ph OTS); $1.80(mf OTS)
56-2-137	10-10519	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-3-60	10-3173	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
56-3-65	10-3243	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-3-72	10-10520	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-3-170	10-3850	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
56-3-180	10-3957	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-4-64	10-5654	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-4-139	10-8370	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

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CF (ORNL)		
56-4-191	10-3948	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-5-30 (Sect. A)	10-5796	Dep.; $0.25(OTS)
56-5-30 (Sect. C)	10-5797	Dep.; $0.20(OTS)
56-5-30 (Sect. G)	10-5798	Dep.; $0.15(OTS)
56-5-30 (Sect. H)	10-5799	Dep.; $0.20(OTS)
56-5-30 (Sect. J)	10-5821	Dep.; $0.15(OTS)
56-5-30 (Sect. K)	10-5800	Dep.; $0.15(OTS)
56-5-30 (Sect. P)	10-5801	Dep.; $0.20(OTS)
56-5-134	10-4572	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
56-5-186	10-10521	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
56-6-21	10-4867	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
56-6-74	10-8281	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
56-6-115	10-11489	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
56-6-148	10-6019	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
56-7-127	10-8656	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
CH		
3578	10-4200	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3782	10-3408	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
3875	10-8757	Dep.; $0.30(OTS)
CHEM-S		
6	10-7211	See RL-4.6.6
216	10-5231	See RL.4.6.216
227	10-7212	See RL-4.6.227
231	10-3565	See RL-4.6.231
233	10-7213	See RL-4.6.233
257	10-7214	See RL-4.6.257
267	10-7215	See RL-4.6.267
CK		
942	10-3500	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1130	10-5274	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1359	10-3501	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1526	10-5098	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1529	10-3502	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1712	10-3503	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1803	10-4201	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
CL		
1039	10-3416	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
CL-FHS		
2	10-4122	See AECD-3870
CL-FTM		
18	10-5094	See AECD-3964
CL-GY		
7	10-7312	See AECD-4162
CL-LEG (Tonawanda)		
1	10-6425	See AECD-3943
CL-SLS		
1	10-3673	See AECD-3869
CLM-JRM		
3	10-4441	See MonP-412
CN		
527	10-2397	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
727	10-5180	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
795	10-3553	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
828	10-10764	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1060	10-2379	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1205	10-4171	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1457	10-6312	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1656	10-5181	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1702	10-3504	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1745	10-7158	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1791	10-4142	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1859	10-4172	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
1869	10-4154	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1873	10-4173	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
1881	10-5182	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2027	10-5331	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2041	10-3434	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2043	10-2972	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2049	10-7245	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2069	10-2456	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2088	10-2346	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2208	10-7358	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2216	10-4202	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2491	10-9756	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2621	10-6170	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2807	10-10781	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2827	10-6171	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2834	10-3593	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3190	10-4120	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3222	10-6172	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3342	10-6173	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3343	10-4124	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3348	10-6174	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3399	10-4203	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3668	10-9746	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
CNL		
5	10-4291	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
17	10-2490	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
34	10-4174	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
36	10-4408	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
39	10-2380	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
41	10-3490	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
COO		
137	10-10052	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
202	10-10728	Dep.; $0.45(OTS)

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COO		
207	10-1370	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
210	10-1162	Dep.; $0.30(OTS)
211	10-9311	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
1015	10-3292	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
CP		
51	10-7297	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
381	10-5381	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
400	10-4471	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
445	10-4409	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
475	10-6394	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
478	10-8989	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
499	10-3708	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
597	10-3647	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
644	10-4348	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
668	10-4472	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
715	10-9878	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1069	10-4410	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1092	10-4361	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1129	10-6395	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1350	10-3709	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1361	10-4411	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1381	10-4362	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1456	10-3710	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1577	10-6396	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1580	10-10947	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1589	10-3758	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1598	10-3759	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1626	10-8930	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1662	10-3711	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1676	10-3736	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1707	10-8990	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1729	10-3658	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1732	10-3760	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1738	10-4292	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1748	10-4349	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1814	10-4412	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1818	10-3748	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1829	10-9794	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1837	10-3608	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1961	10-8785	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1989	10-4413	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2024	10-8991	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
2026	10-5325	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2071	10-4414	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2108	10-5254	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2143	10-5382	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2245	10-5324	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2261	10-3746	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2264	10-10948	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2269	10-5345	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2306	10-4350	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2313	10-4260	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2315	10-4230	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2324	10-6397	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
CP		
2332	10-5250	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2453	10-8992	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2468	10-9879	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2541	10-3836	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2568	10-3659	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2589	10-4358	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2629	10-4261	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2655	10-8993	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2701	10-4415	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2709	10-6398	Dep.; $0.20(OTS)
2824	10-5383	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2883	10-8915	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2907	10-3712	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3061	10-9880	Dep.; $0.35(OTS)
3068	10-4416	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3082	10-8914	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3112	10-9881	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3407	10-6399	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3435	10-4417	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3453	10-4351	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3580	10-5431	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3581	10-4352	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3722	10-8994	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3750	10-4319	Dep.(mc); $19.80(ph OTS); $6.30(mf OTS)
CPP		
54-82	10-9755	See AECD-4216
CRD-A		
19-27(Pt. 3)	10-3604	See AECD-3916
19-27(Pt. 5)	10-3605	See AECD-3949
CRD-T		
1-164	10-4242	See LWS-24552
2A-22	10-6427	See AECD-4005
2B-20	10-3589	See AECD-3847
2B-40	10-4370	See AECD-3948
2B-47	10-3734	See AECD-3941
2B-61	10-4259	See AECD-4004
4A-18	10-3642	See AECD-3848
4A-23	10-3643	See AECD-3849
4A-90	10-10980	See LWS-24220
CT		
611	10-5275	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
751-A	10-6293	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
816	10-3761	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
883	10-3713	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
890	10-2441	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
910	10-4418	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
969	10-3714	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1349	10-9795	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1477	10-4293	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1480	10-8995	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1515	10-5276	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1571	10-3609	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)

Report	Abstract	Availability
CT		
1780	10-5277	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1897	10-3715	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1937	10-4294	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1943	10-4269	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1985	10-5278	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2374	10-5279	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2400	10-4295	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2529	10-4231	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2619	10-4296	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2632	10-6451	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2635	10-9901	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2712	10-7196	Dep.; $0.40(OTS)
2715	10-5261	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2717	10-4297	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2721	10-5124	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2762	10-6159	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2780	10-4298	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2946	10-5125	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2959	10-4473	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2960	10-7258	Dep.; $0.25(OTS)
2965	10-4232	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3013	10-4299	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3031	10-4270	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3036	10-4271	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3043	10-4233	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3044	10-4234	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3060	10-4300	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3151	10-6269	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3152	10-6270	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3153	10-6232	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3371	10-6263	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3372	10-8859	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3374	10-8860	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3439	10-7259	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3460	10-4419	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3515	10-8892	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3522	10-836	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3528	10-9780	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3563	10-4301	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3718	10-837	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3726	10-7249	Dep.; $0.25(OTS)
3765	10-8996	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3899	10-8893	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
CU		
11-56-AT-1042-Ch.E.	10-3187	See NYO-7638
107	10-7369	Dep.; $0.15(OTS)
123	10-7370	Dep.; $0.15(OTS)
144	10-3852	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
CUD		
55	10-5432	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
92	10-4204	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
CWC-ED		
1	10-3468	See M-4558
D		
4.250.13	10-3619	See AECD-3966
4.250.14	10-10869	See AECD-4154
4.250.19	10-7273	See AECD-4104
4-250-30	10-7285	See AECD-4185
4-250-30A	10-7285	See AECD-4185
4.250.31	10-4333	See AECD-3834
4.340.1	10-4458	See AECD-3815
4.340.2	10-4317	See AECD-3820
4.440.1	10-4316	See AECD-3819
4.440.8	10-9765	See AECD-4084
4.490.1	10-6325	See AECD-4122
21	10-2273	See A-4017
23	10-3424	See A-4018
28	10-2274	See A-4022
D-Special		
38	10-4325	See AECD-3823
44	10-4326	See AECD-3824
DA-R		
16	10-5197	See A-3271
DC		
52-28-52	10-5352	See AECD-3958
55-4-46	10-3004	See APEX-238
55-7-41	10-3838	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
DCF		
578	10-7228	See TID-5063
4122	10-4046	See SEP-118
4441	10-9801	See SEP-138
4689	10-8904	See TID-5274
5704	10-1803	See AECD-3665
DOW		
24	10-8803	Dep.; $0.20(OTS)
62	10-676	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
63	10-677	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
67	10-678	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
68	10-679	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
69	10-680	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
72	10-681	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
74	10-682	Dep.(mc); $15.30(ph OTS) $5.40(mf OTS)
76	10-566	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
79	10-683	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
80	10-684	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
81	10-3112	Dep.; $0.45(OTS)
82	10-2749	Dep.; $0.15(OTS)
83	10-685	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
84	10-686	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
85	10-687	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
86	10-688	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

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DOW		
87	10-689	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
88	10-690	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
89	10-1289	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
92	10-745	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
93	10-691	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
94	10-692	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
95	10-693	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
96	10-694	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
97	10-695	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
99	10-696	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
100	10-697	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
101	10-698	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
103	10-699	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
104	10-700	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
105	10-701	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
107	10-702	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
108	10-703	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
109	10-704	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
110	10-705	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
113	10-706	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
114	10-707	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
115	10-708	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
116	10-709	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
117	10-710	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
119	10-2662	Dep.; $0.20(OTS)
120	10-711	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
122	10-712	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
125	10-713	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
127	10-714	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
129	10-715	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
131	10-3122	Dep.; $0.55(OTS)
132	10-716	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
136	10-717	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
138	10-2044	Dep.; $4.80(ph OTS); $2.70(mf OTS)
141	10-3180	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
143	10-4025	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
145	10-6592	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
147	10-10085	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
DP		
18	10-6175	Dep.; $0.25(OTS)
33	10-3142	Dep.; $0.30
47	10-3938	Dep.; $0.20(OTS)
51	10-11344	Dep.; $0.20(OTS)
64	10-3377	Dep.; $0.20(OTS)
72	10-3331	Dep.; $0.15(OTS)
74	10-3435	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
75	10-3436	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
76	10-1235	Dep.; $0.25(OTS)
100	10-2536	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
126	10-10129	Dep.; $0.20(OTS)
130	10-7561	Dep.; $0.20(OTS)
DP		
132	10-6981	Dep.; $0.15(OTS)
135	10-6824	Dep.; $0.15(OTS)
138	10-4784	Dep.; $0.20(OTS)
146	10-4012	Dep.; $0.15(OTS)
150	10-4062	Dep.; $0.15(OTS)
151	10-3906	Dep.; $0.10(OTS)
153	10-5609	Dep.; $0.20(OTS)
158	10-6593	Dep.; $0.30(OTS)
159	10-6852	Dep.; $0.25(OTS)
161	10-8211	Dep.; $0.15(OTS)
162	10-9196	Dep.; $0.25(OTS)
163	10-8592	Dep.; $0.30(OTS)
165	10-8329	Dep.; $0.15(OTS)
DPW		
2071	10-3752	See AECD-3856
DR		
29	10-2370	See A-3226
60	10-2371	See A-3254
64	10-4340	See A-3209
693	10-10992	See A-3247
722	10-5302	See A-3845
723	10-5322	See A-3846
971	10-3668	See M-2273
972	10-3669	See M-2554
973	10-3670	See M-2555
1426	10-5432	See CUD-55
1658	10-4204	See CUD-92
EAH		
52	10-5259	See AECD-3839
69	10-3621	See EAH-87
87	10-3621	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
136	10-4258	See AECD-3873
EN-R		
16	10-4213	See A-3205
ERI		
1943-4-41-T	10-2025	See AECU-3077
2240-1-F	10-4908	See AECU-3160
ETL		
1	10-2408	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2	10-2409	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3 and 4	10-2410	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
5	10-2411	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
6	10-2412	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7	10-2413	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
8	10-2414	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
9	10-2415	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
10	10-2416	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
11	10-2417	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
12	10-2418	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
13	10-2419	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14 and 15	10-2420	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16 and 17	10-2421	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

Report	Abstract	Availability
ETL		
18	10-2422	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
19	10-2423	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
20	10-2424	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
21	10-2425	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
22	10-2426	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
23	10-2427	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
F (Misc.)		
2243	10-3188	See TID-5140
FMPC		
78	10-8827	Dep.; $0.20(OTS)
164 (Rev.1)	10-10844	Dep.; $0.15(OTS)
310	10-2457	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
344	10-7274	Dep.; $0.15(OTS)
FTH		
25	10-10891	Dep.; $0.20(OTS)
GAT		
184	10-7608	Dep.; $0.20(OTS)
185	10-7609	Dep.; $0.15(OTS)
186	10-7497	Dep.; $0.15(OTS)
GAT-L		
77	10-6832	Anal. Chem. 28, 280(1956)
84	10-7094	Appl. Spectroscopy 10, No. 1, 4-7(1956)
120	10-11876	Spectrochim. Acta 8, 54-5(1956)
GE-HB		
7	10-2507	See A-4257
GE-HH		
5	10-2402	See A-4254
GE-LT		
1	10-6354	See A-4256
2	10-5349	See A-4243
GE-RE		
1	10-4366	See A-4315
GEL		
87	10-7235	Dep.; $0.30(OTS)
H		
1.740.8 (Paper 11)	10-10738	See AECD-4003
1.740.10(Paper No. 3)	10-4138	See AECD-3879
3.320.6	10-6222	See AECD-4092
3.320.7	10-6164	See AECD-4093
3.320.8	10-6162	See AECD-4089
4.360.12	10-3533	See AECD-3911
4.360.13	10-4139	See AECD-3881
4.360.14	10-3532	See AECD-3910
5.365.9	10-10786	See AECD-4007
8.385.9	10-9752	See AECD-4006
H		
8.385.10	10-6226	See AECD-4118
8.385.11	10-6227	See AECD-4123
8.385.12	10-6448	See AECD-4116
8.385.14	10-6225	See AECD-4115
9.252.1	10-7284	See AECD-4157
HDC		
852	10-4175	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1440	10-4369	See AECD-3942
HEPL (Misc.)		
68	10-1014	See AECU-3104
78	10-11407	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
HKF		
1 and Suppl.	10-4115	Dep.; $0.35(OTS)
2	10-6400	Dep.; $0.45(OTS)
5	10-6294	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
8(Pts. IV & V)	10-7339	See M-4412(Pts. IV & V)
9	10-9009	See M-4413
13	10-7340	See M-4417
1492D-107	10-5350	See AECD-3902
HW		
7737	10-2288	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
8309	10-2381	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
10137	10-2382	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
10175	10-6260	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
10940	10-3716	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
10960	10-9747	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
11379	10-2480	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
12326	10-6295	Dep.; $0.25(OTS)
12450	10-2383	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
12552	10-3594	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
12637	10-4302	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
12832	10-3762	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
13134	10-4330	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
13167	10-2537	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
13300	10-3437	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
13301	10-2289	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
13658	10-2481	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14226	10-2290	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
14429	10-4272	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
14604	10-7131	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14632	10-7145	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
14708	10-7197	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
15044	10-2291	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
15204	10-2482	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
15742	10-2330	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
15802	10-7271	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
15829	10-3595	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
15846	10-3438	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16092	10-6401	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
17046	10-2292	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
17175	10-3439	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

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17266	10-2347	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
17318	10-5186	Dep.(mc); $1.80(ph OTS); $2.40(mf OTS)
17521	10-2339	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
17538	10-6156	Dep.; $0.15(OTS)
17775	10-2398	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
18034	10-4118	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
18083	10-2429	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
18146	10-2293	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
18260	10-5211	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
18320	10-3440	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
18476	10-2399	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
19165	10-4273	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
19284	10-2315	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
19563	10-2538	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
19852	10-8838	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
19901	10-9882	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
20722	10-2539	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
20725	10-4274	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
20765	10-3596	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
21520	10-2430	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
21793	10-1032	Dep.; $0.25(OTS)
22090	10-7132	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
22679	10-7330	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
22680	10-2294	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
22779	10-4275	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
22845	10-9023	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
23080	10-8767	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
23118	10-7331	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
23314	10-2431	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
23581	10-2442	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
24115	10-10782	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
24455	10-4420	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
24495	10-7139	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
24639	10-4421	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
25107	10-4422	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
25108	10-2247	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
25191	10-4119	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
25205	10-4143	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
25206	10-6125	Dep.; $0.20(OTS)
25239	10-3410	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
25337	10-2432	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
25457(Rev.)	10-7427	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
25581	10-7332	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
25649	10-8997	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
25766	10-7146	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
25771	10-7140	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
26113	10-9748	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
26175	10-10732	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
26207	10-949	Dep.; $0.25(OTS)
26323	10-2433	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
26527	10-8998	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
26574	10-7362	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
26853	10-7275	Dep.(mc); $4.80(ph OTS), $2.70(mf OTS)
27061	10-1552	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
27062	10-7298	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
27090	10-3637	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
27207	10-4303	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
27214	10-4363	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
27229	10-8768	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
27683	10-9784	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
27737	10-7299	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
27910	10-2675	Anal. Chem. 28, 274(1956)
27986	10-9820	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28038	10-7333	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28047	10-5325	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28065	10-10696	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
28129	10-7250	Dep.; $0.30(OTS)
28211	10-7244	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
28263	10-4344	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
28431	10-10862	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28711	10-7171	Dep.; $0.30(OTS)
28897	10-8843	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28917	10-8916	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
28924	10-7359	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29007	10-10986	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29010	10-7159	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29110	10-4423	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29135	10-7334	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29149	10-8870	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
29298	10-4121	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29317	10-8920	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
29319	10-10709	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
29364	10-10824	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29587	10-10902	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29727	10-8871	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
29748	10-1033	Dep.; $0.15(OTS)
29820	10-8769	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
30119	10-2577	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
30142	10-9723	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
30262	10-7363	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
30384	10-4205	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
30390	10-8999	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
30390AD	10-8999	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
30556	10-8787	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
30641	10-4276	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
30643(Rev.)	10-61	Dep.; $0.20 (OTS)
30492	10-10903	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
30727	10-6145	Dep.; $0.15(OTS)
30898	10-3441	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31011	10-4254	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
31157	10-10949	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
31200	10-4345	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31405	10-10833	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31482	10-4424	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31578	10-7147	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
31640	10-6447	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)

Report	Abstract	Availability
HW		
31647	10-7335	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31650	10-8910	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
31744	10-8872	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31883	10-8937	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31886	10-10908	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31911	10-8770	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
31928	10-6146	Dep.; $0.25(OTS)
31929	10-6157	Dep.; $0.25(OTS)
32069	10-7336	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32210(Rev.)	10-11056	Dep.; $0.20(OTS)
32292	10-10697	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
32333	10-9000	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32386	10-8771	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32424	10-9796	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32428	10-10834	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
32436(Rev.)	10-7498	Dep.; $0.20(OTS)
32461-TH	10-9749	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
32497	10-7148	Dep.; $0.20(OTS)
32516	10-2810	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
32534	10-2811	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32535	10-4425	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32634	10-6233	Dep.; $0.20(OTS)
32669	10-4426	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32673	10-6211	Dep.; $0.15(OTS)
32696	10-2812	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32720	10-2813	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
32734	10-8873	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
32755	10-4277	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
32983	10-7562	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
33121	10-10904	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
33486	10-4144	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
33505	10-10905	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
33552	10-8874	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
33596	10-8928	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
33944	10-7276	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
34079(Rev.)	10-2048	Dep.; $0.20(OTS)
34141	10-4145	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
34162	10-4206	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
34187	10-9001	Dep.; $0.10(OTS)
34390	10-8894	Dep.; $0.30(OTS)
34431	10-4207	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
34496	10-8895	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
34499	10-3183	Dep.; $6.30(ph OTS); $3.00(mf OTS)
34528	10-10114	Nucleonics 14, No. 7, 74(1956)
35038	10-1554	Dep.; $0.25(OTS)
35284	10-9892	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
35291	10-9809	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
35917	10-513	Dep.; $28.80(ph OTS); $8.40(mf OTS)
36422	10-7982	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
36692	10-792	Dep.; $0.30(OTS)
36760	10-1203	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
36822	10-10912	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
36831	10-608	Dep.; $0.30(OTS)
36863	10-8911	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
37376	10-4541	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
37519	10-9763	Dep.; $0.30(OTS)
37636	10-3190	Dep.; $0.15(OTS)
37653	10-10524	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
37766	10-10994	Dep.; $0.35(OTS)
37935	10-8772	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
37955	10-4928	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
37956	10-8839	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
37983	10-759	Welding J. (N. Y.) 35, 307-10(1956)
38067	10-8854	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
38079	10-838	Dep.; $6.30(ph OTS); $3.00(mf OTS)
38198	10-3409	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
38318(Rev.)	10-3003	Dep.; $0.20(OTS)
38327	10-9017	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
38387	10-376	Dep.; $4.80 (ph OTS); $2.70 (mf OTS)
38468	10-8840	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
38636	10-9817	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
38644	10-8844	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
38682	10-3141	Dep.; $0.10(OTS)
38698	10-10950	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
38757	10-3774	Dep.; $9.30(ph OTS); $3.60(mf OTS)
38758	10-1163	Dep.; $7.80(ph OTS); $3.30(mf OTS)
38837	10-10765	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
38876	10-1034	Dep.; $0.20(OTS)
38912	10-1638	Dep.; $0.10(OTS)
38982	10-2091	Dep.; $4.80(ph OTS); $2.70(mf OTS)
38991	10-1446	Dep.; $4.80(ph OTS); $2.70(mf OTS)
39080	10-8804	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
39087	10-1318	Dep.; $0.15(OTS)
39129	10-4009	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
39170	10-1857	Dep.; $0.20(OTS)
39190	10-1810	Dep.; $4.80(ph OTS); $2.70(mf OTS)
39277	10-7665	Dep.; $0.20(OTS)
39356	10-1695	Dep.; $0.30(OTS)
39432	10-3337	Dep.(mc); $19.80(ph OTS); $6.30 (mf OTS)
39539	10-3049	Dep.; $0.10(OTS)
39658	10-8841	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
39748	10-8875	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
39767	10-3001	Dep.; $0.15(OTS)
39805	10-2718	Dep.; $1.80(ph OTS); $1.80(mf OTS)
39854	10-8913	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
39942	10-10525	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
39945	10-2614	Dep.; $1.80(ph OTS); $1.80(mf OTS)
39969	10-3002	Dep.; $0.25(OTS)
39971	10-3105	Dep.; $3.30(OTS); $2.40(mf OTS)
40087	10-9777	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
40142	10-2977	Dep.; $9.30(ph OTS); $3.60(mf OTS)
40285	10-3106	Dep.; $1.80(ph OTS); $1.80(mf OTS)
40289	10-9102	Dep.; $0.15(OTS)
40459	10-3209	Dep.; $4.80(ph OTS); $2.70(mf OTS)
40460	10-3125	Dep.; $4.80(ph OTS); $2.70(mf OTS)
40494	10-3050	Dep.; $0.20(OTS)

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HW		
40497	10-3107	Anal. Chem. 28, 1571-6(1956); Dep.; $4.80 (ph OTS); $2.70(mf OTS)
40856	10-3360	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
40919	10-10526	Dep.; $0.35(OTS)
40962	10-9446	Dep.; $0.25(OTS)
41007	10-3939	Dep.; $3.30(ph OTS); $2.40(mf OTS)
41025	10-3275	Dep.; $1.80(ph OTS); $1.80(mf OTS)
41093	10-8534	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
41174	10-11164	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
41184	10-9459	Dep.; $0.20(OTS)
41343	10-11593	Dep.; $3.30(ph OTS); $2.40(mf OTS)
41422	10-9994	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
41500	10-6461	Dep.; $1.00(OTS)
41638	10-11601	Dep.; $0.15(OTS)
41713	10-3780	Dep.; $0.10(OTS)
41797	10-8371	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
41896	10-8659	Dep.; $0.40(OTS)
42181	10-3979	Dep.; $1.80(ph OTS); $1.80(mf OTS)
42200	10-7447	Dep.; $4.80(ph OTS); $2.70(mf OTS)
42331	10-3980	Dep.; $0.20(OTS)
42946	10-6491	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
43056	10-7703	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
43781	10-11662	Dep.; $0.25(OTS)
3-2347	10-6402	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7-2318	10-6403	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7-3721	10-6404	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
HW-R		
11035	10-4341	See AECD-4022
13051	10-3474	See AECD-3865
IC-DTB		
56-10	10-12046	See AECU-3343
IC-GEP		
56-11	10-12103	See AECU-3344
56-12	10-11941	See AECU-3345
56-13	10-11942	See AECU-3346
56-14	10-12014	See AECU-3347
IC-KAH		
56-4	10-11969	See AECU-3334
56-5	10-12012	See AECU-3336
56-6	10-12013	See AECU-3338
56-7	10-12102	See AECU-3340
IC-RJJ		
56-2	10-11983	See AECU-3330
56-3	10-11685	See AECU-3332
IC-WRP		
56-3	10-12065	See AECU-3333
56-4	10-12066	See AECU-3335
56-4(Suppl. 1)	10-12066	See AECU-3335
56-4(Suppl. 2)	10-12066	See AECU-3335
ID-XR		
34	10-7179	See AECD-3878

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IDO		
14218	10-10710	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14313	10-746	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
14316	10-4013	Dep.; $1.75(OTS)
14334	10-115	Dep.; $0.40 (OTS)
14336	10-1453	Dep.; $0.20(OTS)
14341	10-6601	A.I.Ch.E. Journal 2, 190-4(1956)
14347	10-2655	Dep.; $0.25(OTS)
14352	10-839	Nucleonics 14, No. 6, 70, 73, 74-5, and 76-7(1956)
14357	10-1737	Dep.; $0.25(OTS)
14366	10-4573	Dep.; $3.30(ph OTS); $2.40(mf OTS)
14369	10-5579	$0.10(OTS)
14370	10-6825	Dep.; $0.15(OTS)
14371	10-10894	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
14378	10-8337	Dep.; $0.25(OTS)
14379	10-11114	Dep.; $0.35(OTS)
14380	10-8282	Dep.; $0.20(OTS)
16005	10-3870	Dep.; $0.30(OTS)
16008	10-4427	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16011	10-5426	Dep.; $0.15(OTS)
16014	10-1035	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16017	10-5384	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16020	10-1036	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16022	10-2886	Dep.; $0.15(OTS)
16024	10-6405	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16026	10-1037	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16031	10-1038	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16035	10-1039	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16036	10-2887	Dep.; $0.20(OTS)
16047	10-1555	Dep.; $0.70(OTS)
16056	10-2483	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16057	10-1100	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16062	10-4428	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16064	10-3871	Dep.; $0.25(OTS)
16065	10-5309	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16067	10-2139	Dep.; $0.20(OTS)
16071	10-1040	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16074	10-128	Dep.; $0.10 (OTS)
16075	10-1041	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16076	10-2750	Dep.; $0.15(OTS)
16077	10-6406	Dep.; $0.15(OTS)
16078	10-3717	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
16083	10-1042	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16084	10-1924	Dep.; $0.20(OTS)
16085	10-4429	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16092	10-4430	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16093	10-1043	Dep.; $0.15(OTS)
16095	10-2888	Dep.; $0.25(OTS)
16096	10-4176	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16100	10-2889	Dep.; $0.30(OTS)
16104	10-4431	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16105	10-2890	Dep.; $0.20(OTS)
16112	10-4432	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
16114	10-2165	Dep.; $0.25(OTS)

Report	Abstract	Availability
IDO		
16118	10-3401	Dep.; $0.25(OTS)
16125	10-1044	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16127	10-1045	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16131	10-1046	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16133	10-1047	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16136	10-1048	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16138	10-377	Dep.(mc); $10.80 (ph OTS); $3.90 (mf OTS)
16140	10-1049	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
16141	10-567	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16144	10-4433	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16155	10-1050	Dep.; $7.80(ph OTS); $3.30(mf OTS)
16161	10-2891	Dep.; $0.25(OTS)
16162	10-6431	Dep.; $0.15(OTS)
16168	10-3158	Dep.; $4.80(ph OTS); $2.70(mf OTS)
16169	10-6826	Dep.; $0.25(OTS)
16173	10-2108	Dep.; $0.25(OTS)
16179	10-378	Dep.(mc); $4.80 (ph OTS); $2.70 (mf OTS)
16180	10-2166	Dep.; $0.20(OTS)
16182	10-2892	Dep.; $0.25(OTS)
16186	10-1051	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16187	10-1052	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16189	10-2026	Dep.; $0.30(OTS)
16195	10-1144	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16200	10-1053	Dep.; $0.25(OTS)
16208	10-2893	Dep.; $0.35(OTS)
16210	10-379	Dep.; $0.20 (OTS)
16211	10-1614	J. Chem. Phys. 23, 2108-10(1955)
16213	10-3147	Dep.; $0.60(OTS)
16214	10-1925	Dep.; $0.25(OTS)
16222	10-6407	Dep.; $0.25(OTS)
16223	10-341	Dep.; $0.20 (OTS)
16226	10-1907	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
16230	10-12058	J. Chem. Phys. 25, 502-4(1956)
16232	10-5134	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16238	10-3942	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16241	10-380	Dep.; $0.20 (OTS)
16242	10-5942	Phys. Rev. 101, 1053-6(1956)
16243	10-381	Dep.; $0.30 (OTS)
16244	10-8660	Dep.; $0.20(OTS)
16246	10-1087	Dep.; $4.80(ph OTS); $2.70(mf OTS)
16247	10-3157	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
16248	10-3040	Dep.; $0.20(OTS)
16249	10-1054	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16250	10-3041	Dep.; $0.20(OTS)
16251	10-2894	Dep.; $0.15(OTS)
16252	10-3148	Dep.; $4.80(ph OTS); $2.70(mf OTS)
16259	10-3825	Dep.; $0.30(OTS)
16264	10-9883	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16268	10-10915	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16269	10-10976	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16271	10-10906	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16274	10-9813	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16276	10-8939	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
IDO		
16278	10-10883	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16282	10-10951	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16283	10-10735	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16284	10-4084	Dep.; $0.15(OTS)
16285	10-4085	Nucleonics 14, No. 6, 44-9(1956) (Condensed); Dep.; $0.25(OTS)
16289	10-5909	Phys. Rev. 103, 1326-7(1956); Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16291	10-7983	Dep.; $0.35(OTS)
16296	10-8755	Dep.; $1.80(ph OTS); $1.80(mf OTS)
26081	10-5143	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
IMCC		
2035	10-7223	See RMO-2015
2040	10-8902	See RMO-2020
2041	10-65	See RMO-2021
2042	10-7224	See RMO-2022
2076	10-7225	See RMO-2024
2077	10-7226	See RMO-2025
2165	10-3912	See RMO-2030
2168	10-1294	See RMO-2032
2208	10-1295	See RMO-2037
2209	10-1296	See RMO-2038
2210	10-1297	See RMO-2039
2211	10-7227	See RMO-2040
2213	10-3913	See RMO-2042
INDC		
1724	10-4329	See AECD-4002
ISC		
45	10-5280	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
48	10-4304	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
66	10-4177	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
67	10-4178	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
72	10-5099	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
82	10-4305	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
85	10-4179	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
100	10-4180	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
113	10-4306	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
128	10-4307	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
132	10-4308	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
139	10-4235	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
155	10-6176	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
208	10-4309	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
213	10-4310	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
214	10-4278	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
247	10-568	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
258	10-10791	Dep.; $0.30(OTS)
268	10-7160	Dep.; $0.15(OTS)
285	10-5100	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
288 (Suppl.)	10-4614	Dep.; $0.20(OTS)
299	10-4311	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
320	10-5239	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
337	10-4158	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

Report	Abstract	Availability
ISC		
377	10-2719	Dep.; $0.35(OTS)
458	10-2989	Dep.; $0.30(OTS)
463	10-2720	Dep.; $0.20(OTS)
505	10-62	Dep.(mc); $4.80 (ph OTS); $2.70 (mf OTS)
527	10-3887	Dep.; $0.30(OTS)
530	10-569	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
536	10-109	Dep.(mc); $3.30 (ph OTS); $2.40 (mf OTS)
539	10-79	Anal. Chem. 27, 1737-41(1955)
540	10-80	Dep.(mc); $3.30 (ph OTS); $2.40 (mf OTS)
545	10-840	J. Metals 8, 132-6(1956)
549	10-718	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
555	10-1518	Dep.; $0.35(OTS)
563	10-2032	J. Chem. Phys. 23, 2258-63(1955)
574	10-570	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
579	10-1742	Anal. Chem. 28, 79-81(1956)
580	10-8440	Acta Cryst. 9, 367-72(1956)
584	10-609	Dep.; $0.20(OTS)
586	10-3102	Dep.; $0.50(OTS)
588	10-2180	Dep.; $0.40(OTS)
589	10-9370	J. Metals 8, 562-7(1956)
596	10-1236	Dep.; $0.25(OTS)
597	10-3907	Dep.; $0.60(OTS)
599	9-5110	Rev. Sci. Instr. 27, 309-10(1956)
600	10-11054	J. Electrochem. Soc. 103, 421-5(1956)
606	10-4125	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
612	10-2045	Dep.; $0.45(OTS)
613	10-1602	Phys. Rev. 100, 796-8(1955)
615	10-6585	J. Chem. Phys. 25, 75-9(1956)
617	10-1755	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
619	10-6600	A.I.Ch.E. Journal 2, 169-73(1956)
622	10-3048	Spectrochim. Acta 8, 142-51(1956); Dep. (mc); $3.30(ph OTS); $2.40(mf OTS)
623	10-1741	Anal. Chem. 28, 18-21(1956)
624	10-1827	Metal Progr. 68, No. 6, 77-80(1955)
629	10-2207	Phys. Rev. 100, 1407-9(1955)
2212	10-3113	See RMO-2041
631	10-8198	J. Am. Chem. Soc. 78, 1833-7(1956)
634	10-634	Dep.; $0.25(OTS)
637	10-4551	Dep.; $0.50(OTS)
639	10-5773	Acta Cryst. 9, 93-4(1956)
642	10-1774	Dep.; $0.15(OTS)
643	10-571	Dep.; $0.20(OTS)
644	10-3196	Dep.; $0.25(OTS)
645	10-331	Dep.; $0.25 (OTS)
646	10-10015	J. Phys. Chem. 60, 1015-16(1956)
647	10-8013	Dep.; $0.25(OTS)
648	10-8716	Dep.; $0.35(OTS)
650	10-10209	Acta Cryst. 9, 559-63(1956)
652	10-11973	Dep.; $0.25(OTS)
653	10-4624	Dep.; $0.35(OTS)
654	10-11866	Dep.; $0.40(OTS)
655	10-11974	Dep.; $0.45(OTS)
ISC		
656	10-3011	Dep.; $4.80(ph OTS); $2.70(mf OTS)
657	10-6613	Metal Progr. 69, No. 3, 81-8(1956)
658	10-6050	Phys. Rev. 101, 1315-21(1956)
660	10-10092	J. Inorg. and Nuclear Chem. 2, 386-9(1956)
663	10-3108	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
664	10-8046	Phys. Rev. 101, 1784-6(1956)
665	10-6029	Dep.; $0.40(OTS)
666	10-4652	Dep.; $0.25(OTS)
668	10-11039	Dep.; $0.35(OTS)
669	10-4752	Dep.; $0.35(OTS)
677	10-9506	Phys. Rev. 102, 879-81(1956)
676	10-3022	J. Chem. Education 33, 313-17(1956); Dep. (mc); $3.30(ph OTS); $2.40(mf OTS)
682	10-2990	Dep.; $0.15(OTS)
685	10-8014	Dep.; $0.30(OTS)
686	10-11040	Dep.; $0.30(OTS)
688	10-3197	Dep.; $4.80(ph OTS); $2.70(mf OTS)
689	10-10108	J. Org. Chem. 21, 547-50(1956)
690	10-9687	Phys. Rev. 102, 816-23(1956)
692	10-6816	Phys. Rev. 101, 1730-9(1956)
693	10-7563	Dep.; $0.30(OTS)
694	10-7564	Dep.; $0.45(OTS)
696	10-11135	Dep.; $0.25(OTS)
697	10-11046	J. Am. Chem. Soc. 78, 4211-17(1956)
698	10-10042	J. Chem. Phys. 24, 1114(1956)
699	10-4525	Dep.; $0.30(OTS)
702	10-11579	Dep.; $0.50(OTS)
705	10-11770	J. Phys. Chem. 60, 1185-9(1956)
706	10-3903	Dep.; $0.40(OTS)
707	10-3367	Dep.; $0.25(OTS)
708	10-7704	Dep.; $0.30(OTS)
709	10-4930	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
710	10-3788	Dep.; $0.20(OTS)
716	10-3826	Dep.; $0.35(OTS)
717	10-7584	A.I.Ch.E. Journal 2, 38-41(1956)
728	10-9353	J. Am. Chem. Soc. 78, 2906-7(1956)
737	10-8212	Dep.; $0.15(OTS)
738	10-9117	Dep.; $0.25(OTS)
743	10-10186	Dep.; $0.15(OTS)
744	10-10075	Dep.; $0.25(OTS)
JRC		
25	10-6266	See AECD-4033
33	10-10831	See AECD-4073
JWD		
1	10-6142	See M-3029
4	10-7161	See M-256
13	10-7199	See M-854
15	10-5132	See M-875
25	10-5133	See M-1320
32	10-5116	See M-1379

Report	Abstract	Availability
JWD		
33	10-8829	See M-1369
38	10-6238	See M-1378
40	10-3466	See A-2553
64	10-3423	See A-3502
69	10-3521	See A-3506
70	10-3522	See A-3507
74	10-2325	See A-3511
76	10-2312	See A-3513
K		
2.19.10	10-2276	See A-4174
39	10-3476	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
81	10-3442	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
89	10-5212	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
101	10-3586	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
104	10-2340	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
106	10-6318	Dep.; $0.15(OTS)
111	10-6107	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
120	10-2682	Dep.; $0.20(OTS)
130	10-4236	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
136	10-6319	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
137	10-2401	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
218	10-6253	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
226	10-6262	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
236	10-3411	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
272	10-10054	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
273	10-3577	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
276	10-2404	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
286	10-2484	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
292	10-6177	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
299(Rev.)	10-3763	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
315	10-3554	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
316	10-3578	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
342	10-6320	Dep.; $0.25(OTS)
362	10-4256	Dep.; $0.15(OTS)
372	10-3497	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
373	10-3597	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
375	10-6099	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
383	10-6178	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
389	10-4237	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
410	10-10792	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
416	10-3579	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
418	10-5326	Dep.; $0.20(OTS)
421	10-3555	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
425	10-5213	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
427 (Rev.)	10-10766	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
434	10-3123	Dep.; $0.15(OTS)
443	10-10767	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
446	10-4181	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
447	10-3491	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
482	10-3556	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
487	10-6234	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
493	10-5152	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
497	10-3638	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
K		
513	10-3443	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
530	10-5305	Dep.; $0.25(OTS)
532	10-11730	Dep.; $0.10(OTS)
534	10-6235	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
551	10-6236	Dep.; $0.20(OTS)
556	10-4182	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
558	10-4338	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
567	10-7198	Dep.; $0.30(OTS)
570	10-4183	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
577	10-6179	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
579	10-4238	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
586	10-4239	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
596	10-6100	Dep.; $0.25(OTS)
621	10-8805	Dep.; $0.45(OTS)
663	10-7360	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
706	10-3181	Dep.; $0.25(OTS)
719	10-3557	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
720	10-6331	Dep.; $0.15(OTS)
736	10-6441	Dep.; $0.25(OTS)
757	10-3639	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
835	10-6126	Dep.; $0.25(OTS)
843	10-3464	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
864	10-6408	Dep.; $0.25(OTS)
874	10-7509	Superseded by J. Am. Chem. Soc. 78, 561-3(1956)
973(Pt.II)	10-4761	Dep.; $0.20(OTS)
979	10-6341	Dep.; $0.15(OTS)
1071	10-1703	Dep.; $0.20(OTS)
1088	10-1994	Dep.; $0.15(OTS)
1106	10-3346	Dep.; $0.25(OTS)
1135	10-9282	Dep.; $0.20(OTS)
1222	10-242	Dep.; $0.20 (OTS)
1223	10-1490	Dep.; $0.20(OTS)
1232	10-1213	Dep.; $0.35(OTS)
1236	10-3837	Dep.; $6.30(ph OTS); $3.00(mf OTS)
1243	10-1335	Dep.; $4.80(ph OTS); $2.70(mf OTS)
1264	10-3353	Dep.; $6.30(ph OTS); $3.00(mf OTS)
1272	10-3841	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1275	10-3883	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1277	10-3374	Dep.; $0.20(OTS)
1284	10-3842	Dep.; $0.25(OTS)
1285	10-5885	Dep.; $0.20(OTS)
1286	10-4790	Dep.; $0.45(OTS)
1290	10-6055	Dep.; $24.30(ph OTS); $7.50(mf OTS)
1293	10-7613	Dep.; $0.20(OTS)
1294	10-8522	Dep.; $0.30(OTS)
1295	10-10021	Dep.; $0.20(OTS)
1300(Vol. 1, No. 1)	10-8512	Dep.; $0.40(OTS)
1302(Pt. 1)	10-10274	Dep.; $3.30(ph OTS); $2.40(mf OTS)
KAPL		
8	10-8806	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
24	10-3718	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
33	10-4434	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

Report	Abstract	Availability
KAPL		
41	10-1056	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
42	10-1001	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
50	10-4435	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
58	10-1057	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
62	10-1639	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
70	10-4436	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
71	10-6409	Dep.; $0.15(OTS)
82	10-4437	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
104	10-6321	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
130	10-3587	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
180	10-3340	Dep.; $0.35(OTS)
181	10-4146	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
192	10-1237	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
197	10-8876	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
200	10-3174	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
210	10-3444	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
304	10-3719	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
311	10-7337	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
329(Pt. I)	10-6410	Dep.; $0.35(OTS)
329(Pt. II)	10-6411	Dep.; $0.30(OTS)
332	10-6127	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
337	10-3198	Dep.; $0.25(OTS)
421	10-2384	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
428	10-3888	Dep.; $0.20(OTS)
429	10-6338	Dep.; $0.15(OTS)
472	10-6128	Dep.; $0.20(OTS)
494	10-4438	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
511	10-4359	Dep.; $0.20(OTS)
513	10-5153	Dep.; $0.25(OTS)
527	10-3720	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
528	10-3721	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
531	10-1336	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
532	10-1337	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
546	10-1556	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
551	10-3722	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
610	10-7610	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
612	10-4184	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
677	10-6432	Dep.; $0.25(OTS)
718	10-4240	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
722	10-10699	Dep.; $0.20(OTS)
755	10-5113	Dep.; $0.20(OTS)
769	10-3472	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
793	10-5433	Dep.; $0.20(OTS)
813	10-1058	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
828	10-2092	Dep.; $0.20(OTS)
834	10-2663	Dep.; $0.15(OTS)
851	10-2236	Dep.; $0.25(OTS)
852	10-4653	Dep.; $0.20(OTS)
854	10-3332	Dep.; $0.15(OTS)
877	10-10821	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
915	10-5082	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
919	10-3404	Dep.; $0.25(OTS)
931(Del.)	10-11408	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
964	10-3723	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1109	10-5434	Dep.; $0.15(OTS)
1110	10-3299	Dep.; $0.20(OTS)
1116	10-5089	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1154	10-2683	Dep.; $0.25(OTS)
1158	10-1975	Dep.; $0.15(OTS)
1272	10-6844	Dep.; $0.35(OTS)
1278	10-6343	Dep.; $0.20(OTS)
1301	10-1849	Dep.; $0.15(OTS)
1318	10-1002	Dep.; $0.20(OTS)
1340	10-7247	Dep.; $0.15(OTS)
1376	10-2058	Dep.; $13.80(ph OTS); $4.80(mf OTS)
1377	10-3103	Dep.; $4.80(ph OTS); $2.70(mf OTS)
1384	10-119	Dep.; $0.40 (OTS)
1399	10-243	Dep.; $4.80 (ph OTS); $2.70 (mf OTS)
1403	10-1599	Dep.; $0.30(OTS)
1406	10-1772	Dep.; $0.20(OTS)
1411	10-1372	Dep.; $0.40(OTS)
1414	10-1926	Dep.; $0.20(OTS)
1415	10-2804	Dep.; $0.30(OTS)
1416	10-2073	Dep.; $0.40(OTS)
1422	10-1454	Dep.; $0.25(OTS)
1425	10-1238	Dep.; $0.20(OTS)
1443	10-3244	Dep.; $0.25(OTS)
1444	10-1738	Anal. Chem. 28, 1606-7(1956); Dep.; $3.30 (ph OTS); $2.40(mf OTS)
1453	10-3293	Dep.; $0.20(OTS)
1454	10-888	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1455	10-4985	Dep.; $0.30(OTS)
1463	10-3779	Dep.; $7.80(ph OTS); $3.30(mf OTS)
1464	10-5910	Dep.; $0.50(OTS)
1467	10-3843	Dep.; $0.15(OTS)
1469	10-3220	Dep.; $0.30(OTS)
1471	10-3872	Dep.; $0.15(OTS)
1493	10-3955	Dep.; $0.20(OTS)
1494	10-5593	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1497	10-3908	Dep.; $0.20(OTS)
1499	10-6982	Dep.; $0.30(OTS)
1502	10-3929	Dep.; $0.30(OTS)
1522	10-4845	Dep.; $0.25(OTS)
1523	10-3804	Dep.; $0.25(OTS)
1524	10-5965	Dep.; $0.25(OTS)
1527	10-7985	Dep.; $4.80(ph OTS); $2.70(mf OTS)
1528	10-6827	Dep.; $0.30(OTS)
1531	10-7858	Dep.; $0.45(OTS)
1533	10-9316	Dep.; $0.40(OTS)
1539	10-8213	Dep.; $0.35(OTS)
1548	10-11594	Dep.; $0.40(OTS)
1569	10-7804	Dep.; $0.20(OTS)
1571	10-11951	Dep.; $0.25(OTS)
1594	10-12024	Dep.; $0.25(OTS)
KAPL-ADM		
1270	10-3933	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

Report	Abstract	Availability
KAPL-M-AJH		
2	10-9774	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-APB		
1(Del.)	10-9025	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-BMS		
1	10-9797	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-CDM		
2	10-9002	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-CEL		
1	10-9769	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-CME		
1	10-9884	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-DBV		
4	10-10952	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
KAPL-M-DGC		
23	10-10990	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-DJR		
1	10-8921	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-DPT		
2	10-9885	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-DWW		
3	10-10845	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-EBF		
1	10-10907	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-EBJ		
3	10-10953	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-EEB		
7	10-10846	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
11	10-10828	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
12	10-10847	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-EES		
1	10-8773	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-EGB		
2	10-10848	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
14	10-10835	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
16	10-9785	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
17	10-10836	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
21	10-10954	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-ELW		
4	10-10955	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-FCS		
3	10-10956	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-FEC		
3	10-10957	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-FNS		
3	10-10804	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
6	10-10958	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-FWW		
1	10-10849	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2	10-10850	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-GD		
5	10-10959	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-GH		
9	10-10816	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14	10-10810	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
KAPL-M-GHE		
1	10-10817	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-GMR		
4	10-7293	See AECD-3782
KAPL-M-HAM		
1	10-8774	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-HES		
19	10-12025	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-HFK		
3	10-10960	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-HH		
2	10-9003	Dep.; $1.80(ph OTS)
KAPL-M-HHH		
1	10-8896	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-HHW		
2	10-8897	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-HLT		
1	10-10822	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-JBS		
4	10-10961	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
8	10-10867	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-JCS		
1	10-8923	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-JFD		
1	10-9798	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-JHP		
4	10-10962	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-JJB		
1	10-10916	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2	10-10963	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-JMC		
2	10-10851	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

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KAPL-M-JPF		
1	10-7260	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-JRB		
1	10-8845	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-JRG		
3	10-10768	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-JSL		
5	10-10729	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7	10-10722	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
9	10-10723	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-KJK		
1	10-8898	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-LD		
1	10-8929	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-LFE		
7	10-10865	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14	10-9815	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-LGB		
2	10-9004	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-LLW		
4	10-10852	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-LMD		
1	10-8788	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-LML		
1	10-9005	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
KAPL-M-LMO		
1	10-10853	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-LRY		
1	10-8775	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-LWN		
2	10-10711	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-MHS		
23	10-10793	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-MSN		
2	10-10964	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-NGN		
1	10-8877	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-PF		
6-1	10-7172	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-PFZ		
1	10-9821	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-PMC		
1	10-10823	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-RBM		
1	10-8912	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-RCD		
25	10-10854	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-RGK		
11	10-10818	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
14	10-10819	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-RJF		
6	10-10820	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-RLM		
1	10-10855	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-SCT		
4	10-9770	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5 (Rev. 1)	10-10825	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
6	10-9810	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
8	10-9776	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-SKH		
1	10-9007	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-SMS		
3	10-10700	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5	10-10965	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
12	10-10966	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-SP		
4	10-10909	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7	10-10910	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-VW		
1	10-9008	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
KAPL-M-WAB		
1	10-9771	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
KAPL-M-WAH		
2	10-8856	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-WDV		
2	10-10856	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-M-WEC		
2	10-10967	Dep.(mc); $24.30(ph OTS); $7.50(mf OTS)
7 (Rev.1)	10-10968	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
KAPL-M-WHH		
1	10-7371	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3	10-10701	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)

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KAPL-M-WLF		
1	10-8858	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3	10-10857	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
KAPL-M-WOH		
2	10-9018	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KAPL-M-WW		
2	10-7251	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KAPL-P		
1511	10-7622	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1512	10-7623	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
KAPL-M-PLH		
1	10-9006	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
KLI		
1098	10-2975	Dep.; $0.15(OTS)
1219	10-8782	See AECD-4230
1425	10-9282	See K-1135
1918	10-8826	See AECD-4235
3438	10-8766	See AECD-4234
3695	10-11792	See AECU-3695
KLO		
42	10-6177	See K-292
50(Rev.)	10-3763	See K-299(Rev.)
87	10-3597	See K-373
94	10-4237	See K-389
104	10-10792	See K-410
107	10-3579	See K-416
112	10-3555	See K-421
114	10-5213	See K-425
127	10-3491	See K-447
128	10-4181	See K-446
132	10-3123	See K-434
138	10-3556	See K-482
139	10-6234	See K-487
140	10-5152	See K-493
143	10-3638	See K-497
148	10-3443	See K-513
KLX		
35	10-3558	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
37	10-3559	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
55	10-5248	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
58	10-5114	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
60	10-5312	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
61	10-5101	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
63	10-5240	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
64	10-5241	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
66	10-5255	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
68	10-5242	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
71	10-5262	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1036	10-3588	Dep.(mc); $7.80(ph OTS); $3.00(mf OTS)
1305	10-6254	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1310	10-5313	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1312	10-5243	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1321	10-5244	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
KLX		
1326	10-5232	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1334	10-5245	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1336	10-5233	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1339	10-5234	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1347	10-5246	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1355	10-5314	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1356	10-3477	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1363	10-5235	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1377	10-6255	Dep.; $0.15(OTS)
1380	10-5249	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
1384	10-3635	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1388	10-5315	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1390	10-5247	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
1391	10-7238	Dep.; $0.45(OTS)
1392	10-2322	Dep.(mc); $4.30(ph OTS); $2.70(mf OTS)
1393	10-6332	Dep.; $0.25(OTS)
1614	10-5214	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1615	10-5215	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1732	10-6412	Dep.; $0.20(OTS)
1735	10-6983	Dep.; $0.25(OTS)
1744	10-5281	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
KT		
39	10-9014	See AECD-4232
85	10-9772	See AECD-4233
104	10-3482	See AECD-3905
130	10-7113	See AECD-3969
134	10-8758	See AECD-3968
182	10-7303	See AECD-4231
183	10-2105	Dep.; $0.25(OTS)
184	10-4557	Ind. Eng. Chem. 48, 183-7(1956)
KY		
166	10-3203	Dep.; $0.20(OTS)
173	10-10022	Dep.; $1.80(ph OTS); $1.80(mf OTS)
KZ		
891	10-10705	See AECD-3967
1040	10-4265	See AECD-3779
LA		
5	10-4353	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
28	10-2504	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
42	10-2443	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
44	10-3610	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
47	10-3724	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
55	10-2568	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
66	10-5335	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
68	10-6296	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
70	10-5183	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
76	10-2505	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
78	10-2444	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
81	10-2569	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
91	10-2506	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
112	10-3505	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)

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LA		
147	10-2385	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
149	10-2386	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
172	10-3506	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
206	10-4439	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
243	10-2550	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
266	10-3667	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
276	10-4354	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
303	10-5115	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
313	10-2387	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
347	10-2348	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
381	10-3507	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
399	10-11492	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
422R	10-4241	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
485	10-5435	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
502	10-2349	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
507	10-2295	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
603	10-2491	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
609	10-3749	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
639	10-2350	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
695	10-2388	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
696	10-2296	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
703	10-2297	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
738	10-2298	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
739	10-2299	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
742	10-3795	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
753	10-4346	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1078	10-4457	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1082	10-10783	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1106	10-7277	Dep.; $0.15(OTS)
1123	10-6413	Dep.; $0.25(OTS)
1128	10-2300	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1139	10-7173	Dep.; $0.15(OTS)
1176	10-8776	Dep.; $0.35(OTS)
1188	10-3764	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1197	10-2301	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1201	10-6350	Dep.; $0.15(OTS)
1236	10-6264	Dep.; $0.20(OTS)
1250	10-9824	Dep.; $0.15(OTS)
1285	10-6129	Dep.; $0.25(OTS)
1309	10-1200	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1314	10-2351	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1315	10-2352	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1325	10-9731	Dep.; $0.15(OTS)
1336	10-1145	Dep.; $0.25(OTS)
1343	10-2389	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1345	10-2302	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1389	10-2390	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1423	10-3775	Dep.; $0.30(OTS)
1431	10-2615	Dep.; $0.15(OTS)
1439	10-2391	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1508	10-10288	Dep.(mc); $4.25(ph OTS); $2.70(mf OTS)
1523	10-6108	Dep.; $0.15(OTS)
1550	10-2257	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1551	10-6339	Dep.; $0.20(OTS)
1567	10-3267	See LA-1721(Rev.)
1571	10-9902	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1585	10-8777	Dep.; $0.25(OTS)
1607	10-7278	Dep.; $0.20(OTS)
1717	10-10316	Dep.; $0.30(OTS)
1721(Rev.)	10-3267	$1.25(OTS)
1722	10-3267	See LA-1721(Rev.)
1853	10-9825	Dep.; $0.20(OTS)
1897	10-6130	Dep.; $0.20(OTS)
1909	10-9460	Nucleonics 14, No. 9, 114-17(1956) (Condensed); Dep.; $3.30(ph OTS); $2.40 (mf OTS)
1913	10-1760	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1927	10-3917	Dep.; $13.80(ph OTS); $4.80(mf OTS)
1930	10-3801	Dep.; $0.30(OTS)
1937	10-3932	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1938	10-8535	Dep.; $0.25(OTS)
1940	10-1619	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1947	10-1739	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1960	10-2171	Dep.; $0.25(OTS)
1963	10-9252	Dep.; $0.25(OTS)
1967	10-10023	Dep.;
1972UNM	10-3998	Dep.; $1.80(ph OTS); $1.80(mf OTS)
1975	10-4566	Dep.; $6.30(ph OTS); $3.00(mf OTS)
1982	10-4791	Dep.; $0.20(OTS)
1990	10-6859	Dep.; $0.25(OTS)
1993	10-7655	Dep.; $0.25(OTS)
1994	10-7778	Dep.; $0.25(OTS)
1995	10-10024	Dep.; $0.20(OTS)
2016	10-6948	Dep.; $1.25(OTS)
2017UNM	10-6521	Dep.; $0.15(OTS)
2028	10-9283	Dep.; $0.20(OTS)
LAMS		
121	10-3648	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
289	10-5282	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
315	10-6297	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
727	10-2540	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
769	10-2472	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
991	10-6426	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1358	10-9026	Dep.; $0.15(OTS)
1892	10-1640	Dep.; $0.10(OTS)
1949	10-3160	Dep.; $0.20(OTS)
1973	10-3155	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
LFR		
4	10-10917	See BNL-1072
LMFR		
9	10-6658	See BNL-395
LMSC		
1	10-8398	See AECU-3143

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LRL		
76	10-2059	Dep.; $0.20(OTS)
83	10-1938	Dep.; $0.20(OTS)
88	10-2074	Dep.; $0.25(OTS)
101	10-1332	Dep.; $0.20(OTS)
115	10-7565	Dep.; $0.15(OTS)
122	10-8015	Dep.; $0.15(OTS)
134	10-6428	Dep.; $0.15(OTS)
158	10-912	Dep.; $0.35(OTS)
160	10-2459	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
LWS		
12019	10-3660	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
12085	10-841	Dep.; $0.15(OTS)
22514(Pt.5)	10-3605	See AECD-3949
23014	10-3643	See AECD-3849
23065	10-3734	See AECD-3941
23101	10-6427	See AECD-4005
24108	10-4370	See AECD-3948
24190	10-4259	See AECD-4004
24220	10-10980	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
24552	10-4242	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
M		
3-D320	10-7124	See AECD-4100
38	10-7111	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
256	10-7161	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
854	10-7199	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
875	10-5132	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
884	10-8828	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
887	10-5216	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1047	10-9757	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1048	10-8807	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1060	10-6237	Dep.(mc); $3.30(ph OTS); $2.70(mf OTS)
1091	10-6098	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1320	10-5133	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1327	10-8931	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1349	10-6180	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1350	10-6181	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1369	10-8829	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1378	10-6238	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1379	10-5116	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1485	10-5251	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1772	10-5327	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1974	10-5091	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
2102	10-10794	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2103	10-9758	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2104	10-7200	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2113	10-7201	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2115	10-8808	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2132	10-10730	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2142	10-3560	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2177	10-5154	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2178	10-6239	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2179	10-6182	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2273	10-3668	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
M		
2327	10-3492	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2498	10-6298	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2554	10-3669	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2555	10-3670	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2783	10-5117	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3001	10-5217	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3009	10-5218	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3015	10-8830	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3029	10-6142	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3030	10-6240	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3049	10-7372	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3056	10-6241	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3082	10-6183	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3095	10-5430	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3105	10-5283	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3106	10-5284	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3107	10-5285	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3132	10-5127	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
3300	10-5417	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3451	10-10769	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3685	10-5328	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3752	10-5286	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3712	10-3735	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3753	10-5385	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3754	10-5386	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3832	10-837	See CT-3718
3845	10-3582	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3846	10-3583	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3856	10-5387	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3975	10-5388	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3989	10-5287	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4079	10-6414	Dep.; $0.15(OTS)
4087	10-3412	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4100	10-9799	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4123	10-6109	Dep.; $0.25(OTS)
4128	10-2541	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
4164	10-6110	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4166	10-7338	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4168	10-3585	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
4178	10-9835	See CF-47-11-13
4204	10-4461	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4231	10-10795	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4232	10-10770	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4233	10-10712	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4234	10-10713	Dep.(mc); $3.30(ph OTS); $2.70(mf OTS)
4235	10-10714	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4237	10-10796	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4240	10-5118	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4241(Pt. III)	10-3493	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4242	10-10715	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4244	10-10797	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4245	10-1239	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4247	10-10716	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4248	10-5219	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4249	10-10717	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

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M		
4250	10-10718	Dep.(mc); $3.30(ph OTS); $2.70(mf OTS)
4251	10-5220	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4253	10-5221	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4254	10-10719	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4321	10-7239	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4330	10-4147	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4337	10-3414	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4372	10-6415	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4412 (Pts. IV & V)	10-7339	Dep.(mc); $34.80(ph OTS); $9.90(mf OTS)
4413	10-9009	Dep.(mc); $21.30(ph OTS); $6.90(mf OTS)
4415	10-10969	Dep.; $1.00(OTS)
4417	10-7340	Dep.(mc); $59.40(ph OTS); $11.10(mf OTS)
4423	10-5389	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4426	10-6257	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4430	10-2542	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
4461	10-4440	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4470	10-5306	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4483	10-3494	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4497	10-7236	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4528	10-5436	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4534	10-2303	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4540	10-6184	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS).
4556	10-3467	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4558	10-3468	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
4576	10-3671	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4585	10-3598	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4615	10-8786	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
4883	10-8781	See AECD-3776
5073	10-8818	See AECD-4039
5082	10-4264	See AECD-3778
5384	10-8879	See AECD-4057
MB		
169	10-4201	See CK-1803
183	10-5209	See CC-2105
MCW		
8	10-7162	Dep.; $0.20(OTS)
31	10-5222	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
102	10-10798	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
103	10-3561	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
124	10-10799	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
134	10-3445	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
136	10-3562	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
168	10-4243	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
175	10-6242	Dep.; $0.15(OTS)
177	10-7261	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
185	10-5223	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
210	10-4244	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
248	10-747	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
MCW-A		
77	10-5264	See AECD-3904
82	10-7267	See NYO-5226
MEMO-CWT		
3	10-9011	See AECD-3871
6	10-9012	See AECD-3939
MEMO-DEM		
1	10-9021	See AECD-4221
Memo-FAW		
3	10-6338	See KAPL-429
MEMO-GHS		
1	10-9013	See AECD-4218
Memo-HB		
5	10-6362	See AECD-4038
8	10-9895	See AECD-4222
14	10-6363	See AECD-4042
MEMO-HES		
9	10-8933	See AECD-4220
MEMO-JIO		
1(Rev.)	10-8946	See AECD-4209
MEMO-JSK		
4	10-8938	See AECD-4226
MEMO-LFE		
1	10-3857	See AECD-3709
Memo-NEC		
6	10-1336	See KAPL-531
7	10-1337	See KAPL-532
MEMO-RGK		
13	10-7237	See AECD-4227
MEMO-RML		
1	10-9788	See AECD-4228
MEMO-RS		
1	10-9831	See AECD-4219
MEMO-TMS		
7	10-9830	See AECD-4217
MIT		
1018(Pt. 1)	10-6299	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
1028	10-3739	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1029(Pt. I)	10-5288	Dep.(mc); $22.80(ph OTS); $7.20(mf OTS)
1029(Pt.II)	10-5289	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1034(Pt. I)	10-5290	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
1034(Pt. II)	10-6300	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1045(Pt. I)	10-5291	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1058	10-6301	Dep.(mc); $16.30(ph OTS); $6.00(mf OTS)
1063	10-5298	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1066	10-9019	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1085	10-6433	Dep.; $0.20(OTS)

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MIT		
1090	10-3611	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1091	10-2193	Dep.; $0.20(OTS)
1092	10-3817	Dep.; $0.20(OTS)
1105	10-1766	Dep.; $0.20(OTS)
1107	10-8899	Dep.; $0.40(OTS)
1110	10-1740	Dep.; $0.45(OTS)
MIT-EBR		
8	10-3425	See AECD-3850
14	10-610	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
MIT-JEA		
6	10-4266	See AECD-3900
MIT-RBR		
4	10-3526	See AECD-3851
MIT-SVA		
18	10-4285	See AECD-3852
26	10-4287	See AECD-3876
MIT-PG		
1	10-5269	See AECD-4036
MITG		
203	10-10838	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
208	10-2392	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
211	10-6243	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
215	10-6185	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
216	10-7202	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
223	10-7203	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
228	10-8809	Dep.; $0.15(OTS)
230	10-7254	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
231	10-6186	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
232	10-6187	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
233	10-8810	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
234	10-8811	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
235	10-7163	Dep.; $0.25(OTS)
236	10-6244	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
238	10-7164	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
242	10-7204	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
244	10-3563	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
245	10-10800	Dep.; $0.25(OTS)
248	10-10801	Dep.; $0.25(OTS)
251	10-10802	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
252	10-10771	Dep.; $0.25(OTS)
262	10-8831	Dep.; $0.45(OTS)
263	10-7165	Dep.; $0.25(OTS)
MITG-A		
29	10-7133	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
31	10-9750	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
35	10-9751	Dep.; $0.40(OTS)
38	10-8812	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
44	10-8778	Dep.; $0.30(OTS)
60	10-10803	Dep.; $0.25(OTS)
65	10-8779	Dep.; $0.25(OTS)
MITG-A		
73	10-7205	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
74	10-7206	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
77	10-7207	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
80	10-7252	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
95	10-7180	See AECD-4101
106	10-7182	See AECD-4105
107	10-10739	See AECD-4108
108	10-8789	See AECD-4113
111	10-3347	Dep.; $0.25(OTS)
113	10-7183	See AECD-4106
MITG-S		
10	10-4162	See AECD-4063
MITS		
31	10-5587	See NYO-7178
ML (Misc.)		
43	10-6266	See AECD-4033
265	10-406	See AECU-3046
270	10-5557	Biochim. et Biophys. Acta 18, 165(1955)
MLM		
188	10-3617	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
205	10-1427	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
229	10-2485	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
232	10-116	Dep.; $0.20 (OTS)
291	10-3622	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
373	10-3375	Dep.; $0.30(OTS)
379-1 (Extract)	10-10702	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
380	10-5236	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
381	10-6101	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
406	10-6256	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
442	10-6102	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
527	10-5083	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
529(Del.)	10-5329	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
567	10-3126	Dep.; $0.35(OTS)
572	10-2112	Dep.; $0.30(OTS)
615	10-1428	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
641	10-3378	See TID-5087
677	10-1429	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
729	10-2684	Dep.; $0.15(OTS)
748	10-3789	Dep.; $0.20(OTS)
761	10-2578	Dep.; $0.40(OTS)
808	10-1430	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
871	9-3929	Phys. Rev. 98, 599-604(1955)
884	10-7869	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
896	10-2195	Dep.; $0.15(OTS)
976	10-3252	Science 121, 97-8(1955) (Condensed)
995	10-2979	Dep.; $6.30(ph OTS); $3.00(mf OTS)
1003	10-3844	Dep.; $0.25(OTS)
1020	10-3300	Dep.; $0.25(OTS)
1022	10-645	Dep.; $0.25(OTS)
1050	10-3163	Dep.; $0.15(OTS)
1052	10-3777	Dep.; $1.80(ph OTS); $1.80(mf OTS)
1054	10-4072	Dep.; $0.35(OTS)
1055	10-1249	Anal. Chem. 27, 1875-8(1955)

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MLM		
1057	10-2966	Dep.; $0.15(OTS)
1059	10-511	J. Bacteriol. 69, 607-15(1955)
1060	10-1839	Dep.; $0.15(OTS)
MLM-CF		
54-12-2	10-1839	See MLM-1060
MLM-M		
1246	10-7124	See AECD-4100
MonC		
37	10-5307	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
53	10-5390	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
77	10-5224	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
132	10-3740	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
145	10-6188	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
189	10-9888	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
398	10-3725	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
422	10-4126	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
MonE		
64	10-6416	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
MonH		
218	10-9730	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
MonN		
27	10-5299	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
92	10-5184	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
139	10-6189	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
157	10-5391	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
231	10-6190	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
232(Rev.)	10-10970	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
262	10-5392	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
299	10-5393	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
308	10-6417	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
MonP		
8	10-6345	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
47	10-5437	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
48	10-6452	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
60	10-5394	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
78	10-6351	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
152	10-5395	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
172	10-9889	Dep.; $0.30(OTS)
198	10-5396	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
203	10-6418	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
226	10-5397	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
246	10-3873	Dep.; $0.35(OTS)
250	10-10913	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
283	10-9891	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
305	10-5398	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
321	10-5338	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
344	10-7240	Dep.(mc); $4.30(ph OTS); $2.70(mf OTS)
356	10-3661	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
357	10-3230	Dep.; $0.20(OTS)
360	10-2543	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
379	10-7341	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
MonP		
402	10-5399	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
412	10-4441	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
413	10-4442	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
423	10-4443	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
427	10-5400	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
428	10-3726	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
434	10-3727	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
437	10-5339	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
457	10-3728	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
MonT		
81	10-6271	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
154	10-7361	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
164	10-3641	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
181	10-8813	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
199	10-6245	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
221	10-5300	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
223	10-5102	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
408	10-2331	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
MTA		
36	10-2965	Dep.; $0.20(OTS)
41	10-2237	Dep.; $0.20(OTS)
50	10-6340	Dep.; $0.20(OTS)
MTRL		
54-91	10-1054	See IDO-16249
54-92	10-3041	See IDO-16250
54-99	10-5134	See IDO-16232
202	10-3040	See IDO-16248
247	10-1087	See IDO-16246
MUC-AMW		
36	10-3402	See N-985
MUC-CAH		
41	10-5402	See N-2300
MUC-EC		
52	10-5292	See N-381
MUC-ERR		
210	10-5081	See AECD-4070
MUC-FD		
8	10-5401	See N-1668b
MUC-FF		
140	10-10884	See N-1289f
228	10-6352	See N-1755
MUC-FTS		
12	10-5120	See TID-5242
MUC-FWHZ		
166	10-10784	See N-1817
MUC-GTS		
1012	10-6143	See N-1617

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MUC-GTS		
2148	10-6191	See N-2205
MUC-GY		
29	10-5252	See N-1908
MUC-HG		
1218	10-6131	See N-1536pn
MUC-JIW		
297	10-4245	See N-1974
MUC-MS		
283	10-5135	See N-1570
MUC-WPJ		
14	10-2486	See N-812
MURA-IO (Misc.)		
6	10-8694	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
MURA-LJL		
9	10-7016	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
MURA-LWJ		
12	10-10596	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
MXL-WHN		
10	10-4323	See AECD-3780
N		
34	10-5225	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1536pn	10-6131	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
381	10-5292	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
812	10-2486	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
985	10-3402	Dep.; $0.15(OTS)
1282d	10-5254	See CP-2108
1289f	10-10884	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1367	10-2487	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1372	10-2464	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1543	10-6419	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1570	10-5135	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1617	10-6143	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1666	10-5133	See M-1320
1668b	10-5401	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1755	10-6352	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1817	10-10784	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1908	10-5252	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1974	10-4245	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2194	10-7115	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2205	10-6191	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2236	10-9010	Dep.(mc); $1.80(ph OTS); $2.70(mf OTS)
2300	10-5402	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2318	10-6425	See AECD-3943
NAA-AL		
228	10-3672	See AECD-3862
NAA-SR		
4	10-2316	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
8	10-5403	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
9	10-5404	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
10	10-2317	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
NAA-SR		
13	10-6309	Dep.; $0.20(OTS)
16	10-2407	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
20	10-2318	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
21	10-5411	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
23	10-5136	Dep.; $0.25(OTS)
24	10-2492	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
30	10-7342	Dep.; $0.35(OTS)
32	10-7149	Dep.; $0.15(OTS)
33	10-6147	Dep.; $0.20(OTS)
37	10-5418	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
38	10-5419	Dep.; $0.30(OTS)
39	10-5137	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
43	10-6148	Dep.; $0.25(OTS)
49	10-2465	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
51	10-5138	Dep.(mc); $3.30(ph OTS); 2.40(mf OTS)
58	10-2445	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
59	10-5139	Dep.; $0.20(OTS)
67	10-2319	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
68	10-2320	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
71	10-6434	Dep.; $0.25(OTS)
95	10-6435	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
121	10-7354	Dep.; $0.25(OTS)
122	10-7343	Dep.; $3.30(ph OTS)
138	10-3889	Dep.; $0.30(OTS)
151	10-6149	Dep.; $0.15(OTS)
158	10-6322	Dep.; $0.25(OTS)
168	10-2554	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
196	10-2649	Dep.; $0.25(OTS)
202	10-3786	Dep.; $0.15(OTS)
211	10-6436	Dep.; $0.15(OTS)
226	10-6346	Dep.; $0.20(OTS)
248	10-2555	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
268	10-3368	Dep.; $0.35(OTS)
275	10-2544	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
286	10-2497	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
287	10-3882	Dep.; $0.25(OTS)
288	10-10731	Dep.; $0.25(OTS)
845	10-3853	Dep.; $0.20(OTS)
862	10-5140	Dep.; $0.30(OTS)
863	9-3097	Ind. Eng. Chem. 48, 1242-7(1956)
912	10-6132	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
924	10-3874	Dep.; $0.20(OTS)
925	10-5340	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
926	10-3348	Dep.; $0.25(OTS)
1016	10-3379	Dep.; $0.20(OTS)
1026	10-3904	Dep.; $0.30(OTS)
1029	10-3313	Dep.; $0.25(OTS)
1057	10-3797	Dep.; $0.20(OTS)
1087	10-6111	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1102	10-3314	Dep.; $0.25(OTS)
1127	10-4086	Dep.; $0.30(OTS)
1137(Pt.1)	10-1495	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1152	10-3405	Dep.; $0.25(OTS)
1157	10-3911	Dep.; $0.25(OTS)
1204	10-3315	Dep.; $0.20(OTS)

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NAA-SR		
1205	10-2258	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1227	10-6569	Dep.; $10.80(ph OTS); $3.90(mf OTS)
1264	9-4725	Anal. Chim. Acta 15, 181-6(1956)
1287	10-6437	Dep.; $0.20(OTS)
1288	10-5144	Nucleonics 14, No. 7, 50-4(1956); Dep.; $0.20(OTS)
1361	10-10772	Dep.; $0.20(OTS)
1395	10-11058	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1398	10-3156	Dep.; $0.30(OTS)
1443	10-3333	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1446	10-4014	Superseded by Anal. Chem. 28, 806-8 (1956); Dep.; $3.30(ph OTS); $2.40 (mf OTS)
1452	10-3307	Dep.; $0.30(OTS)
1458	10-2968	Am. J. Roentgenol. Radium Therapy Nuclear Med. 76, 372-5(1956); Dep.; $1.80(ph OTS); $1.80(mf OTS)
1477	10-3322	Dep.; $0.20(OTS)
1488	10-4015	Dep.; $0.25(OTS)
1509	10-6548	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1517	10-7987	Dep.; $0.30(OTS)
1525	10-3316	Dep.; $0.50(OTS)
1531	10-8404	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1535	10-8662	Dep.; $0.20(OTS)
1536	10-8536	Dep.; $0.25(OTS)
1544	10-11689	Dep.; $0.30(OTS)
1546	10-8663	Dep.; $0.20(OTS)
1550	10-9672	Dep.; $1.80(ph OTS); $1.80(mf OTS)
1564	10-11736	Dep.; $0.30(OTS)
1567	10-8664	Dep.; $0.25(OTS)
1571	10-12096	Phys. Rev. 103, 1193-1202(1956)
1580	10-8711	Dep.; $0.25(OTS)
1591	10-8250	Dep.; $0.25(OTS)
1592	10-7051	Dep.; $0.30(OTS)
1598	10-8331	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1603	10-11835	Dep.; $0.20(OTS)
1618	10-4087	Dep.; $0.25(OTS)
1622	10-11493	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
1627	10-11107	Dep.; $0.20(OTS)
1637	10-9390	Dep.; $0.40(OTS)
1641	10-10416	Dep.; $0.25(OTS)
1649	10-10113	Dep.; $3.30(ph OTS); $2.40(mf OTS)
1690	10-12026	Dep.; $0.40(OTS)
NAA-SR-Memo		
9	10-7304	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
22	10-10987	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
26	10-10837	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
85	10-10971	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
112	10-10858	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
138	10-7344	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
149	10-7345	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
158	10-6365	See AECD-4080
165	10-5361	See AECD-4035
173	10-5360	See AECD-4034
186	10-7352	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
NAA-SR-Memo		
195	10-7109	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
199	10-7373	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
213	10-8943	See AECD-4020
305	10-5357	See AECD-4021
314	10-5362	See AECD-4041
318	10-5363	See AECD-4052
337	10-6357	See AECD-3860
339	10-10972	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
349	10-5356	See AECD-4014
355	10-10973	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
366	10-5355	See AECD-4012
368	10-5366	See AECD-4074
469	10-4262	See AECD-3831
485	10-7141	See AECD-3861
557	10-5627	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
578	10-5365	See AECD-4072
651	10-6347	See AECD-4098
706	10-5354	See AECD-4011
784	10-8665	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1104	10-3254	See AECD-3728
1115	10-6696	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1123	10-4846	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1475	10-3149	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1488	10-4015	Anal. Chim. Acta 14, 514-26(1956)
1631	10-4088	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
NAA-SR-Misc		
4	10-5409	See TID-5029
NBL		
117	10-81	Dep.; $0.30 (OTS)
126	10-3915	Dep.; $0.25(OTS)
127	10-3999	Dep.; $0.25(OTS)
NBS		
6	10-6272	Dep.; $0.20(OTS)
202	10-2304	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2812	10-9230	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3328	10-488	Dep.; $3.30 (ph OTS); $2.40 (mf OTS)
3329	10-63	Dep.; $3.30 (ph OTS); $2.40 (mf OTS)
3519	10-8233	Dep.; $0.25(OTS)
4032	10-3361	Dep.; $0.20(OTS)
4143	10-11148	J. Am. Chem. Soc. 78, 2844-6(1956)
4161	10-1726	Dep.; $3.30(ph OTS); $2.40(mf OTS)
4420	10-3136	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4514	10-3217	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
4611	10-6559	Dep.; $0.50(OTS)
NBS-C		
100	10-6120	See AECD-4019
562	10-2976	Dep.; $0.50(GPO)
567	10-2787	Dep.; $1.00(GPO)
568	10-3185	Dep.; $0.20(GPO)
NBS-D		
106	10-640	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)

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NBS-D		
116	10-9786	See AECD-4008
125	10-7114	See AECD-4040
128	10-6310	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
129	10-7226	See AECD-4031
131	10-3603	See AECD-3903
NBS-P		
28	10-6307	See AECD-4009
NDA		
16	10-3150	Dep.; $9.30(ph OTS); $3.60(mf OTS)
18	10-6984	Dep.; $3.30(ph OTS); $2.40(mf OTS)
12-16	10-6928	Dep.; $3.30(ph OTS); $2.40(mf OTS)
14-12	10-5272	See AECD-4059
15C-53	10-312	See NYO-6268
NEVIS		
13	10-2133	Phys. Rev. 100, 1490-3(1955)
16	10-3032	Nuovo cimento (10) 4, 283-306(1956); Dep. (mc); $9.30(ph OTS); $3.60(mf OTS)
18	10-10375	Nuovo cimento (10) 3, 1093-1103(1956)
26	10-8023	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
NLCO		
595	10-3175	Dep.; $0.75(OTS)
NMI		
1119	10-2077	Dep.; $0.30(OTS)
NNES		
I-1(Chap. 6)	10-10826	Dep.; $0.25(OTS)
I-8	10-3210	See TID-5219
I-10	10-3140	See TID-5214
I-13	10-3162	See TID-5213
II-16(App. C)	10-6217	See AECD-3892
VII-2B (Chap. 8)	10-5198	See A-4044
VII-2B (Chap. 10)	10-5222	See MCW-31
NNSD-NSPS		
1008	10-5000	Dep.; $0.35(OTS)
NP (AEC File No. for Non-AEC Reports)		
6021(Pt.II)	10-6985	$7.80(ph OTS); $3.30(mf OTS)
NYO		
33	10-5155	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
60	10-8900	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
63	10-9732	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
67	10-8901	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
80	10-8615	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
110(Del.)	10-2446	Dep.(mc); $33.30(ph OTS); $9.60(mf OTS)
968	10-1508	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1003	10-10773	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1009	10-7167	Dep.; $1.00(OTS)
1093	10-1215	Dep.; $0.20(OTS)
1114	10-7262	Dep.; $0.20(OTS)
1116	10-8814	Dep.; $0.40(OTS)
1126	10-5293	Dep.; $0.20(OTS)
1127	10-2447	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1315	10-7166	Dep.; $0.20(OTS)
1323	10-1290	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
NYO		
1326	10-636	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1455	10-1291	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1500	10-8816	Dep.; $0.65(OTS)
1516	10-851	Dep.; $0.20(OTS)
1521	10-2248	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1595	10-11794	Dep.; $0.30(OTS)
2000	10-10720	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
2001	10-6133	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2002	10-10721	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3108	10-578	Dep.; $10.80(ph OTS); $3.90(mf OTS)
3222	10-9561	Phys. Rev. 102, 740-6(1956)
3232	10-8722	Ann. N. Y. Acad. Sci. 62, 503-42(1956)
3313	10-654	Dep.; $1.50(OTS)
3320	10-515	Dep.; $0.35(OTS)
3444	10-8222	Anal. Chim. Acta 14, 131-5(1956)
3345	10-955	Dep.; $0.45(OTS)
3454	10-7263	Dep.; $0.45(OTS)
3499	10-147	Dep.; $4.80 (ph OTS); $2.70 (mf OTS)
3535	10-3747	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3557	10-732	Anal. Chem. 27, 1770-4(1955)
3559	10-731	Anal. Chem. 27, 1704-7(1955)
3560	10-11130	Anal. Chem. 28, 1476-9(1956)
3576	10-7243	Dep.; $0.50(OTS)
3606	10-611	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3738	10-3354	Dep.; $0.15(OTS)
3783	10-1947	J. A. Ceram. Soc. 38, 423-32(1955)
3784	10-3845	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3865(2 Parts)	9-7555	Phys. Rev. 99, 1608-9(1955)
	10-7936	Phys. Rev. 101, 1798-1803(1956)
3873	10-590	J. Am. Chem. Soc. 75, 2777-8(1953)
3887	10-5519	J. Am. Chem. Soc. 77, 6091-8(1955)
3888	10-7530	J. Chem. Phys. 23, 1982(1955)
3908	10-2030	J. Chem. Phys. 23, 2410-14(1955)
3913	10-7264	Dep.; $0.30(OTS)
3916	10-3124	Dep.; $0.35(OTS)
3918	10-1320	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3919	10-1641	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3920	10-1728	Dep.; $9.30(ph OTS); $3.60(mf OTS)
3921	10-3276	Dep.; $0.20(OTS)
3958	10-7469	Dep.; $0.20(OTS)
3959	10-7470	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3983	10-6579	J. Chem. Phys. 23, 2457-8(1955)
4000	10-7134	Dep.; $0.15(OTS)
4569	10-9723	Dep.(mc); $24.30(ph OTS); $7.50(mf OTS)
4608	10-11779	Dep.; $0.40(OTS)
4632	10-1341	Dep.; $0.15(OTS)
4640	10-252	Dep.; $0.20 (OTS)
4641	10-754	Dep.; $0.35(OTS)
4642	10-516	Dep.; $1.00(OTS)
4644	10-10	Dep.; $0.15 (OTS)

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4654	10-2593	Dep.; $1.25(OTS)
4671	10-11564	Phys. Rev. 103, 955-6(1956)
4682-A	10-6493	Dep.; $0.40(OTS)
4699	10-7019	Dep.; $0.40(OTS)
4720	10-8666	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4924	10-1167	Dep.; $4.80(ph OTS); $2.70(mf OTS)
4926	10-3897	Dep.; $3.30(ph OTS); $2.40(mf OTS)
4927	10-3900	Dep.; $6.30(ph OTS); $3.00(mf OTS)
5052	10-5226	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5067	10-7208	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5074	10-5227	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5075	10-4246	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5079	10-924	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5084	10-5228	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5087	10-3446	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5097	10-5141	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5119	10-748	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5123	10-4247	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5129	10-3599	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5130	10-3447	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5131	10-1146	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5134	10-3448	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5148	10-3417	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5157	10-10703	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5163	10-3413	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5164	10-3564	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5191	10-719	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5193	10-5156	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5194	10-4248	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5195	10-3765	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5208	10-3449	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5210	10-3450	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5211	10-4249	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5213	10-3451	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5214	10-3452	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5217	10-3453	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5218	10-3454	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5219	10-3455	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5221	10-4250	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5225	10-3612	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5226	10-7267	Dep.; $0.10(OTS)
5229	10-3456	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5230	10-3457	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5236	10-3458	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5237	10-8151	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5244	10-7135	Dep.; $0.15(OTS)
5259	10-5229	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5260	10-5230	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
6011	10-5157	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
6053	10-11120	J. Am. Chem. Soc. 78, 3954-8(1956)
6068	10-5630	Dep.; $0.50(OTS)
6069	10-4038	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
6073(3 Parts)	10-8731 10-9685 10-9433	Phys. Rev. 102, 464-5(1956) Phys. Rev. 102, 800-1(1956) Phys. Rev. 102, 1014-15(1956)
6148	10-3159	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
6223	10-5995	Phys. Rev. 101, 1370-2(1956)
6224	10-5812	Phys. Rev. 101, 519-22(1956)
6225	10-11927	J. Chem. Phys. 25, 385-8(1956)
6226	10-11928	J. Chem. Phys. 25, 422-5(1956)
6264	10-1229	Mining Eng. 7, 958-62(1955)
6268	10-312	Dep.; $10.80 (ph OTS); $3.90 (mf OTS)
6328	10-2023	Dep.; $0.20(OTS)
6329	10-5770	Dep.; $0.20(OTS)
6451	10-1342	Dep.; $0.20(OTS)
6457	10-3034	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
6478	10-235	Dep.; $0.30 (OTS)
6481	10-5892	Dep.; $0.30(OTS)
6482	10-2805	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
6485	10-4774	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
6486 MH-I	10-11887	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
6486 MH-II	10-11888	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
6486 MH-III	10-11889	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
6486 MH-IV	10-11890	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
6506	10-2997	Dep.; $0.70(OTS)
6590	10-2008	Dep.; $0.20(OTS)
6599	10-1814	Dep.; $0.15(OTS)
6600	10-7031	J. Appl. Phys. 27, 657-8(1956)
6626	10-1601	Dep.; $0.55(OTS)
6627	10-11524	Dep.; $0.60(OTS)
6628	10-11345	Dep.; $0.75(OTS)
6637	10-5994	Phys. Rev. 101, 1074-6(1956)
6639	10-10580	Phys. Rev. 103, 236-9(1956)
6674	10-6666	Dep.; $3.30(ph OTS); $2.40(mf OTS)
7048	10-183	Dep.; $1.80 (ph OTS); $1.80 (mf OTS)
7049	10-2081	Acta Met. 4, 407-13(1956); Dep.; $0.25(OTS)
7050	10-1383	Acta Met. 4, 414-20(1956); Dep.; $0.25(OTS)
7051	10-2082	Dep.; $0.20(OTS)
7052	10-6704	Dep.; $0.10(OTS)
7053	10-1384	Acta Cryst. 9, 466-71(1956)
7054	10-3285	Dep.; $0.30(OTS)
7055	10-1385	Phys. Rev. 101, 1441-2(1956)
7075	10-184	Dep.; $1.80 (ph OTS); $1.80 (mf OTS)
7077	10-6705	Dep.; $0.10(OTS)
7080	10-3012	Acta Met. 4, 477-84(1956); Dep.; $0.25(OTS)
7107	10-5873	Phys. Rev. 101, 1149-58(1956)
7128	10-7006	Phys. Rev. 101, 1493-1504(1956)

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NYO		
7129	10-2669	J. Am. Chem. Soc. 77, 6519-21(1955)
7135	10-1015	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7137	10-1594	Phys. Rev. 100, 940-2(1955)
7139	10-4830	Phys. Rev. 101, 320-3(1956)
7152	10-11110	pp.177-87 of Proceedings of the Conferences on Carbon, Univ. of Buffalo, N. Y., 1956.
7153	10-11112	pp.217-22 of Proceedings of the Conferences on Carbon, Univ. of Buffalo, N. Y., 1956.
7154	10-11109	pp.155-66 of Proceedings of the Conferences on Carbon, Univ. of Buffalo, N. Y., 1956.
7155	10-11111	pp.195-215 of Proceedings of the Conferences on Carbon, Univ. of Buffalo, N. Y., 1956.
7165	10-925	J. Franklin Inst. 261, 373-6(1956)
7173	10-1781	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
7175	10-3189	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
7178	10-5587	$9.30(ph OTS); $3.60(mf OTS)
7210	10-8638	Phys. Rev. 102, 391-6(1956)
7214	10-1216	Dep.; $0.20(OTS)
7219	10-8194	J. Am. Chem. Soc. 78, 674-6(1956)
7228	10-6583	J. Am. Chem. Soc. 78, 2939-43(1956)
7237	10-6808	Dep.; $0.30(OTS)
7282	10-4530	J. Phys. Chem. 59, 1115-16(1955)
7283	10-70	J. Phys. Chem. 59, 1074-6(1955)
7284	10-7486	J. Am. Chem. Soc. 78, 1549-52(1956)
7298	10-3133	$4.80(ph OTS); $2.70(mf OTS)
7321	10-5950	Phys. Rev. 101, 1358-67(1956)
7322	10-2160	Phys. Rev. 100, 1409-14(1955)
7323	10-2104	Rev. Sci. Instr. 26, 112-19(1955)
7326	10-1605	Phys. Rev. 100, 945-6(1955)
7324	10-4946	Phys. Rev. 101, 152-7(1956)
7325	10-4947	Phys. Rev. 101, 158-65(1956)
7344	10-9559	Phys. Rev. 102, 733-8(1956)
7375	10-10407	Phys. Rev. 103, 727-38(1956)
7376	10-11527	Phys. Rev. 103, 958-61(1956)
7377	10-655	J. Chem. Phys. 23, 1961-2(1955)
7378	10-4737	Phys. Rev. 101, 37-40(1956)
7379	10-1944	Dep.; $0.15(OTS)
7380	10-8714	Phys. Rev. 102, 348-55(1956)
7382	10-12114	Phys. Rev. 103, 1227-39(1956)
7383	10-12119	J. Opt. Soc. Amer. 46, 456-62(1956)
7384	10-7079	J. Opt. Soc. Amer. 46, 495-9(1956)
7410	10-3922	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7412	10-3923	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7439	10-6706	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7440	10-11840	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7452	10-6046	Phys. Rev. 101, 1041(1956)
7453	10-11341	Nuovo cimento (10) 3, 223-5(1956)
7454	10-7042	Phys. Rev. 102, 1560-7(1956)
7455	10-1003	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7456	10-4842	Phys. Rev. 101, 506-7(1956)
7457	10-8610	Phys. Rev. 102, 269(1956)
7458	10-7913	Rev. Sci. Instr. 27, 171(1956)
7472	10-2769	Phys. Rev. 100, 1627-9(1955)
7477	10-1386	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7479	10-11939	J. Franklin Inst. 261, 373-6(1956)
7482	10-3199	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7485	10-3369	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7486	10-4697	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7487	10-7567	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7488	10-7568	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7489	10-7569	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
7490	10-7570	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7491	10-7571	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7492	10-7717	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7493	10-4662	Dep.; $3.30(ph OTS); $2.40(mf OTS)
7494	10-7718	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7496	10-7719	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7502	10-5952	Phys. Rev. 101, 1389-95(1956)
7505	10-6967	Phys. Rev. 101, 1613-14(1956)
7506	10-6968	Phys. Rev. 101, 1614-15(1956)
7522	10-5128	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7535	10-9510	Phys. Rev. 102, 1185-7(1956)
7536	10-12071	Phys. Rev. 103, 1443-9(1956)
7537	10-10370	Phys. Rev. 103, 777-81(1956)
7538	10-7048	Phys. Rev. 102, 1641-7(1956)
7588	10-4097	Phys. Rev. 103, 1391-3(1956); Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7589	10-11549	Phys. Rev. 103, 1098-1101(1956)
7590	10-11413	Phys. Rev. 103, 956-7(1956)
7592	10-4108	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
7593	10-5008	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7594	10-6908	Nuovo cimento (10) 3, 1471-3(1956)
7597	10-3271	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7615	10-11051	J. Phys. Chem. 60, 1131-5(1956)
7631	10-7783	Dep.(mc); $21.20(ph OTS); $6.90(mf OTS)
7638	10-3187	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7676	10-12061	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
7691	10-11891	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7711	10-8182	Dep.; $1.80(ph OTS); $1.80(mf OTS)
7780	10-8283	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7785	10-8411	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
ORINS		
10	10-544	Dep.; $0.75(OTS)
12	10-10083	Dep.; $2.20(OTS)
14	10-11346	Dep.; $0.50(OTS)
ORNL		
5	10-6192	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
19	10-2323	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)

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ORNL		
25	10-2406	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
26	10-2545	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
30	10-6420	Dep.; $0.25(OTS)
32	10-4466	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
33	10-4467	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
34	10-5346	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
37	10-4251	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
40	10-4185	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
41	10-4186	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53	10-4474	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
65	10-5103	Dep.(mc); $30.30(ph OTS); $8.70(mf OTS)
73	10-4444	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
93	10-4279	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
96	10-4187	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
105	10-4188	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
106	10-6438	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
113	10-7346	Dep.; $0.35(OTS)
120	10-4445	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
120(Suppl.1)	10-4446	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
129	10-5420	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
163	10-5237	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
167	10-7347	Dep.; $0.30(OTS)
173	10-4280	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
178	10-4252	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
196	10-1452	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
203	10-4447	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
239	10-4189	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
241	10-4448	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
255	10-4449	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
272	10-5336	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
275	10-4190	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
277	10-5421	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
282	10-4321	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
300	10-5119	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
301(Rev.)	10-8338	Dep.; $0.40(OTS)
330	10-5158	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
357	10-4450	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
360	10-7348	Dep.; $0.30(OTS)
388	10-3623	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
393	10-4255	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
401	10-6421	Dep.; $0.20(OTS)
418	10-5347	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
428	10-4451	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
431	10-6344	Dep.; $0.20(OTS)
438	10-4452	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
472	10-4453	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
473	10-6302	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
500	10-4257	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
516	10-6335	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
525	10-4454	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
548	10-6422	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
550	10-2546	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
563	10-3729	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
599	10-4148	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
614	10-5159	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
628	10-6423	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
630	10-5405	Dep.(mc); $21.30(ph OTS); $6.90(mf OTS)
634	10-6336	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
636	10-5427	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
641	10-4355	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
692	10-2169	Dep.; $0.30(OTS)
701	10-3730	Dep.(mc); $22.80(ph OTS); $7.20(mf OTS)
704	10-4312	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
722	10-5238	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
728	10-6424	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
733	10-4281	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
748(Suppl.)	10-5428	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
772	10-6273	Dep.; $0.35(OTS)
793	10-4322	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
824	10-5406	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
826	10-5407	Dep.(mc); $24.30(ph OTS); $7.50(mf OTS)
833	10-4313	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
836	10-5256	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
848	10-4282	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
887	10-579	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
912	10-7168	Dep.; $0.25(OTS)
920	10-4314	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
923	10-5330	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
958	10-4364	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
961	10-4149	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
979	10-5319	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
983	10-7136	Dep.; $0.75(OTS)
1047	10-720	Dep.; $0.25(OTS)
1064	10-3324	Dep.; $0.25(OTS)
1091	10-5320	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1124	10-7241	Dep.; $0.35(OTS)
1144	10-3025	Dep.; $0.20(OTS)
1146	10-7253	Dep.; $0.40(OTS)
1196	10-6429	Dep.; $0.70(OTS)
1205	10-5408	Dep.; $0.50(OTS)
1209	10-4127	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1220	10-10774	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1232	10-5321	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1310	10-4191	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1317	10-1118	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1325	10-4157	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1352	10-6096	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1378	10-7364	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1381(Rev.)	10-7110	Dep.; $0.20(OTS)
1392	10-5310	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1396	10-3109	Dep.; $0.25(OTS)
1418	10-7209	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1419	10-3349	Dep.; $0.20(OTS)
1422	10-3836	Dep.; $1.00(OTS)
1468	10-4663	Dep.; $0.20(OTS)

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ORNL		
1469(Suppl.2)	10-1016	Dep.; $0.30(OTS)
1476	10-3334	Dep.; $0.20(OTS)
1513	10-4263	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1521	10-6134	Anal. Chem. 28, 1527-30(1956); Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1569	10-5566	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1583	10-10974	Dep.; $0.45(OTS)
1617	10-5341	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1700	10-4986	Dep.; $0.20(OTS)
1712	10-6311	Dep.; $0.15(OTS)
1720	10-6581	Dep.; $0.25(OTS)
1738	10-7572	Dep.; $9.30(ph OTS); $3.60(mf OTS)
1783	10-3890	Dep.; $0.40(OTS)
1790	10-3875	Dep.; $0.30(OTS)
1797	10-7210	Dep.; $0.25(OTS)
1837	10-1325	Anal. Chem. 27, 1923-7(1955)
1839	10-4931	Dep.; $0.35(OTS)
1846	10-7137	Dep.; $0.30(OTS)
1847	10-10035	Anal. Chem. 28, 1285-8(1956)
1860	10-42	Dep.; $6.30 (ph OTS); $3.00 (mf OTS)
1879	10-320	Dep.; $12.30 (ph OTS); $4.50 (mf OTS)
1888	10-129	Dep.; $12.30 (ph OTS); $4.50 (mf OTS)
1892	10-1459	Dep.; $0.45(OTS)
1894	10-4932	Dep.; $0.20(OTS)
1897	10-942	J. Assoc. Comput. Mach. 3, No. 2, 85-100(1956)
1898	10-8336	J. Phys. Chem. 60, 558-91(1956)
1900	10-105	Dep.; $0.15 (OTS)
1907	10-1292	Dep.; $0.25(OTS)
1913	10-1519	Dep.; $0.25(OTS)
1927	10-11758	Dep.; $0.15(OTS)
1928	10-244	Dep.; $6.30 (ph OTS); $3.00 (mf OTS)
1929	10-1466	Dep.; $0.30(OTS)
1930	10-721	Dep.; $7.80(ph OTS); $3.30(mf OTS)
1932	10-612	Dep.; $0.25(OTS)
1933	10-130	Dep.; $6.30 (ph OTS); $3.00 (mf OTS)
1942	10-43	Dep.; $6.30 (ph OTS); $3.00 (mf OTS)
1945	10-3035	Dep.; $13.80(ph OTS); $4.80(mf OTS)
1949	10-4574	Dep.; $0.30(OTS)
1950	10-82	Dep.; $3.30 (ph OTS); $2.40 (mf OTS)
1951	10-1240	Dep.; $0.20(OTS)
1952	10-1293	Dep.; $0.30(OTS)
1953	10-1168	Dep.(mc); $22.80(ph OTS); $7.20(mf OTS)
1957	10-210	Rev. Sci. Instr. 27, 273-7(1956); Dep.; $4.80(ph OTS); $2.70(mf OTS)
1958	10-1498	J. Nuclear Energy 2, 153-67(1956)
1963	10-10086	Dep.; $0.30(OTS)
1964	10-7573	Dep.; $0.55(OTS)
1966	10-1328	Dep.; $0.20(OTS)
1972	10-489	Dep.; $3.30 (ph OTS); $2.40 (mf OTS)
1975	10-3144	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
1977	10-5573	J. Phys. Chem. 60, 239-45(1956)
1983	10-2806	Dep.; $12.30(ph OTS); $4.50(mf OTS)
1984	10-8339	Dep.; $0.20(OTS)
1987	10-1927	Dep.; $0.60(OTS)
1989	10-2685	Combined with AECD-3596 in J. Phys. Chem. 60, 878-83(1956); Dep.; $6.30 (ph OTS); $3.00(mf OTS)
1990	10-9325	Dep.; $0.35(OTS)
1992	10-1642	Nuclear Sci. and Eng. 1, 20-32(1956); Dep.; $4.80(ph OTS); $2.70(mf OTS)
1997	10-3023	Dep.; $4.80(ph OTS); $2.70(mf OTS)
1998	10-6594	Dep.; $15.30(ph OTS); $5.40(mf OTS)
2001	10-7500	Dep.; $0.25(OTS)
2006	10-3176	Anal. Chem. 28, 1049-51(1956)
2007	10-3949	Dep.; $3.30(ph OTS); $2.40(mf OTS)
2008	10-4685	Corrosion 12, 87t-91t(1956)
2013	10-2816	Dep.; $6.30(ph OTS); $3.00(mf OTS)
2018	10-3950	Dep.; $0.20(OTS)
2019	10-3880	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2023	10-3954	Dep.; $0.50(OTS)
2025	10-3186	Dep.; $0.25(OTS)
2026	10-3186	Dep.; $0.25(OTS)
2028	10-3026	Dep.; $10.80(ph OTS); $3.90(mf OTS)
2031	10-3350	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2034	10-3186	Dep.; $0.25(OTS)
2035	10-3798	Dep.; $0.20(OTS)
2037	10-3211	Dep.; $4.80(ph OTS); $2.70(mf OTS)
2040	10-3177	Dep.; $0.20(OTS)
2047	10-3317	Dep.; $0.30(OTS)
2048	10-3282	pp.71-94 of "Nuclear Metallurgy — A Symposium on Behaviour of Materials in Reactor Environment, February 20, 1956." IMD Special Report Series No. 2. New York, American Inst. of Mining and Metallurgical Engineers, Inc., 1956. 94p. $3.75.
2049	10-3981	Dep.; $10.80(ph OTS); $3.90(mf OTS)
2050	10-3212	Dep.; $0.15(OTS)
2051	10-5617	$10.80(ph OTS); $3.90(mf OTS)
2053	10-11841	Dep.; $0.30(OTS)
2054	10-4625	Dep.; $1.80(ph OTS); $1.80(mf OTS)
2058	10-7574	Dep.; $4.80(ph OTS); $2.70(mf OTS)
2059	10-3268	Dep.; $1.80(ph OTS); $1.80(mf OTS)
2060	10-3768	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2064	10-4063	Dep.; $3.30(ph OTS); $2.40(mf OTS)
2066	10-3940	Dep.; $0.10(OTS)
2067	10-4762	Dep.; $4.80(ph OTS); $2.70(mf OTS)
2068	10-4933	Dep.; $0.15(OTS)
2076	10-6755	Dep.; $12.30(ph OTS); $4.50(mf OTS)
2084	10-8284	Dep.; $4.80(ph OTS); $2.70(mf OTS)
2085	10-8667	Dep.; $0.10(OTS)
2086	10-8668	Dep.; $0.15(OTS)
2087	10-7989	Dep.; $0.15(OTS)
2088	10-7990	Dep.; $0.30(OTS)
2090	10-8669	Dep.; $0.15(OTS)
2091	10-8670	Dep.; $0.20(OTS)
2092	10-7602	Dep.; $0.35(OTS)
2093	10-5802	Dep.; $9.30(ph OTS); $3.60(mf OTS)

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ORNL		
2098	10-7932	Dep.; $4.80(ph OTS); $2.70(mf OTS)
2099	10-5567	Dep.; $0.45(OTS)
2101	10-8614	Dep.; $0.20(OTS)
2105	10-5815	Dep.; $3.30(ph OTS); $2.40(mf OTS)
2107	10-9514	Dep.; $0.20(OTS)
2111	10-8285	Dep.; $0.25(OTS)
2112	10-7603	Dep.; $0.30(OTS)
2114	10-8736	Dep.; $0.40(OTS)
2116	10-8505	Dep.; $0.25(OTS)
2120	10-10307	Dep.(mc); $0.75(OTS)
2121	10-9603	Dep.; $0.30(OTS)
2122	10-11197	Dep.; $0.20(OTS)
2130	10-10002	Dep.; $0.15(OTS)
2132	10-11780	Dep.; $0.50(OTS)
2133	10-8525	Dep.; $0.40(OTS)
2134	10-11947	Dep.; $0.25(OTS)
2135	10-9144	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2136	10-8259	Dep.; $0.35(OTS)
2137	10-9648	Dep.; $0.45(OTS)
2139	10-12062	Dep.; $3.30(ph OTS); $2.40(mf OTS)
2141	10-11329	Dep.; $0.20(OTS)
2142	10-9543	Dep.; $0.20(OTS)
2146	10-10308	Dep.; $0.40(OTS)
2147	10-10194	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2153	10-11059	Dep.; $0.20(OTS)
2154	10-10669	Dep.(mc); $22.80(ph OTS); $7.20 (mf OTS)
2159	10-11691	Dep.; $0.55(OTS)
ORO		
26(Rev.)	10-6841	Dep.; $0.50(OTS)
118	10-6314	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
125	10-3773	Dep.; $5.50(GPO)
136	10-83	Dep.; $0.15 (OTS)
139	10-763	Dep.; $1.00(OTS)
143	10-2062	Dep.; $0.15(OTS)
145	10-1169	Dep.; $0.65(OTS)
146	10-580	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
148	10-3341	Dep.; $0.25(OTS)
149	10-3930	Dep.; $0.10(OTS)
150	10-3769	Dep.; $0.65(OTS)
151	10-10417	Dep.; $0.20(OTS)
152	10-7396	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
153	10-7397	Dep.(mc); $25.80(ph OTS); $7.80(mf OTS)
154	10-10165	Dep.; $0.15(OTS)
155	10-9212	Dep.; $10.80(ph OTS); $3.90(mf OTS)
156	10-9213	Dep.; $9.30(ph OTS); $3.60(mf OTS)
157	10-9214	Dep.; $12.30(ph OTS); $4.50(mf OTS)
OSR-TN (Misc.)		
55-320	10-1014	See AECU-3104
P		
809	10-10659	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
P		
849-AEC	10-5776	See AECU-3250
PB		
121103	10-9039	Dep.; $0.50(OTS)
121303	10-10059	Dep.; $2.00(OTS)
121304	10-11119	Dep.; $0.75(OTS)
121305	10-9916	Dep.; $2.75(OTS)
121306	10-9917	Dep.; $0.75(OTS)
121307	10-9918	Dep.; $0.50(OTS)
121308	10-9919	Dep.; $1.25(OTS)
121309	10-9920	Dep.; $0.50(OTS)
121310	10-9921	Dep.; $2.00(OTS)
121313	10-9922	Dep.; $0.50(OTS)
PPC		
15	10-5359	See AECD-4032
86	10-9883	See IDO-16264
97	10-10906	See IDO-16271
117	10-10894	See IDO-14371
126	10-9813	See IDO-16274
149	10-8939	See IDO-16276
169	10-10883	See IDO-16278
PTR		
4	10-10951	See IDO-16282
5	10-10735	See IDO-16283
8	10-8755	See IDO-16296
14	10-10915	See IDO-16268
19	10-10976	See IDO-16269
R		
50GL20	10-4258	See AECD-3873
52GL51	10-2405	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
53GL91	10-7235	See GEL-67
54GL303	10-5791	See AECU-3171
116	10-3032	See NEVIS-16
RES		
1480	10-6320	See K-342
RFP		
55	10-3290	Dep.; $0.20(OTS)
56	10-4016	Dep.; $0.15(OTS)
61	10-4793	Dep.; $0.25(OTS)
64	10-8286	Dep.; $0.25(OTS)
RL		
4.6.6	10-7211	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4.6.151	10-3495	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.216	10-5231	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.227	10-7212	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.231	10-3565	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.233	10-7213	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.257	10-7214	Dep.(mc); $7.80(ph OTS)
4.6.260	10-2393	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4.6.265	10-2394	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.267	10-7215	Dep.(mc); $4.80(ph OTS)

Report	Abstract	Availability
RL		
4.6.271	10-3640	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.276	10-7216	Dep.(mc); $3.30(ph OTS)
4.6.321	10-2395	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.910	10-9759	Dep.(mc); $3.30(ph OTS)
4.6.913	10-9760	Dep.(mc); $1.80(ph OTS)
4.6.921	10-8832	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4.6.923	10-8833	Dep.(mc); $3.30(ph OTS)
4.6.925	10-7217	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4.6.929	10-7218	Dep.(mc); $3.30(ph OTS) $2.40(mf OTS)
4.6.931	10-7374	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.933	10-7375	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.934	10-9761	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4.6.936	10-7219	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4.6.937	10-7220	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.938	10-7221	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4.6.939	10-7222	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4.6.940	10-8834	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
7.6.36	10-7279	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
7.6.37	10-7280	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
12.6.17	10-1267	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
16.6.49	10-3750	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
28.5.109	10-2498	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
28.5.114	10-2547	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.117	10-3662	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.120	10-2451	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.121	10-2452	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.135	10-2241	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.139	10-2453	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.144	10-2454	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
28.5.146	10-2493	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
RM		
1412-AEC		See AECU-3102
1453-AEC	10-5024	See AECU-3251
1556-AEC	10-1129	See AECU-3111
1578-AEC	10-1836	See AECU-3125
1670-AEC	10-4689	See AECU-3199
RME		
42(Pt. 1)	10-7668	Dep.; $0.40(OTS)
51	10-796	Dep.; $0.20(OTS)
58(Pt.I)	10-1350	Dep.; $0.25(OTS)
73	10-797	Dep.; $0.15(OTS)
75(Pt.1)	10-798	Dep.; $0.25(OTS)
76(Pt.1)	10-799	Dep.; $0.20(OTS)
77(Pt.1)	10-800	Dep.; $0.20(OTS)
78	10-5647	Univ. of New Mexico Publications in Geol. No. 5. Albuquerque, Univ. or New Mexico Press, 1955. 120p. plus 1 illus. $2.00.
79	10-2063	Dep.; $0.20(OTS)
80(Pt.I)	10-1351	Dep.; $0.20(OTS)
86	10-11189	Dep.; $0.20(OTS)
1044	10-1352	Dep.; $0.20(OTS)
1049	10-148	Dep.; $0.15 (OTS)
1059	10-801	Dep.; $0.20(OTS)
2015	10-1784	Dep.; $0.20(OTS)
2021	10-802	Dep.; $0.15(OTS)
2023	10-1353	Dep.; $0.25(OTS)
2024	10-1354	Dep.; $0.15(OTS)
2027	10-803	Dep.; $0.15(OTS)
2031(Pt.1)	10-4630	Dep.; $0.15(OTS)
2032(Pt.1)	10-1355	Dep.; $0.20(OTS)
3105	10-1356	Dep.; $0.45(OTS)
3106	10-149	Dep.; $0.50 (OTS)
3107	10-2064	Dep.; $0.25(OTS)
3110(Pt.1)	10-150	Dep.; $7.80 (ph OTS); $3.30 (mf OTS)
3110(Pt.III)	10-1785	Dep.; $0.70(OTS)
3112	10-1357	Dep.; $0.25(OTS)
3113	10-804	Dep.; $0.20(OTS)
3116	10-805	Dep.; $0.25(OTS)
3119	10-1358	Dep.; $0.55(OTS)
3125	10-3130	Dep.; $0.20(OTS)
3127	10-11190	Dep.; $0.25(OTS)
3137(Pt. I)	10-11823	Econ. Geol. 51, 495-520(1956)
4054	10-806	Dep.; $0.25(OTS)
RMO		
407	10-7122	See A-1064
2010	10-11759	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2015	10-7223	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2020	10-8902	Dep.(mc); $30.30(ph OTS); $8.70(mf OTS)
2021	10-65	Dep.; $1.80 (ph OTS); $1.80 (mf OTS)
2022	10-7224	Dep.(mc); $16.80(ph OTS); $5.70(mf OTS)
2024	10-7225	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
2025	10-7226	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2030	10-3912	Dep.; $0.60(OTS)
2032	10-1294	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2037	10-1295	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2038	10-1296	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
2039	10-1297	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2040	10-7227	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2041	10-3113	Dep.; $0.40(OTS)
2042	10-3913	Dep.; $0.60(OTS)
2501	10-2991	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2502	10-722	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2503	10-723	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2504	10-724	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2505	10-107	Dep.(mc); $4.80 (ph OTS); $2.70 (mf OTS)
2506	10-2015	Dep.; $0.20(OTS)
2507	10-2686	Dep.; $0.15(OTS)
2508	10-2035	Dep.; $0.15(OTS)
2509	10-2617	Dep.; $0.20(OTS)
2510	10-3114	Dep.; $0.20(OTS)
2512	10-3115	Dep.; $0.20(OTS)
2516	10-1767	Dep.; $0.20(OTS)
2517	10-2992	Dep.; $0.25(OTS)

Report	Abstract	Availability
UMO		
2518	10-3342	Dep.; $0.30(OTS)
2519	10-2664	Dep.; $0.20(OTS)
2520	10-2687	Dep.; $0.20(OTS)
2522	10-2688	Dep.; $0.20(OTS)
2523	10-2689	Dep.; $0.20(OTS)
2525	10-2690	Dep.; $0.20(OTS)
2526	10-2036	Dep.; $0.15(OTS)
2527	10-2037	Dep.; $0.25(OTS)
2530	10-3343	Dep.; $0.25(OTS)
2531	10-3277	Dep.; $0.15(OTS)
2532	10-2665	Dep.; $0.30(OTS)
2533	10-11136	Dep.; $0.30(OTS)
2607	10-725	Dep.; $0.25(OTS)
2611	10-2038	Dep.; $0.30(OTS)
2612	10-1298	Dep.; $0.20(OTS)
2616	10-1321	Dep.; $0.50(OTS)
2617	10-1299	Dep.; $0.25(OTS)
2701	10-4192	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2702	10-4193	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2703	10-4194	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2704	10-4195	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2705	10-4196	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2706	10-4197	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2707	10-5160	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2708	10-5161	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2709	10-2259	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2710	10-2260	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2711	10-5162	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2712	10-5163	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2713	10-5164	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2714	10-5165	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2715	10-2261	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2716	10-2262	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2717	10-5166	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2718	10-5167	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2719	10-2263	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2720	10-2264	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2721	10-5168	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2722	10-2265	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2723	10-5169	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2724	10-2266	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2725	10-5170	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2726	10-3418	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2728	10-5171	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2733	10-5172	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4000	10-1300	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4002	10-1301	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
S		
191	10-5305	See K-530
210	10-6320	See K-342
SC		
3004(TR)	10-7281	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
SC		
3288(TR)	10-7268	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
3459(TR)	10-7242	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3497(TR)	10-7282	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3585(TR)	10-7287	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3610(TR)	10-11245	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
3659A(TR)	10-10291	Dep.; $0.45(OTS)
3674(TR)	10-10829	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3734(M)	10-8903	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
7016(SP)	10-10131	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
SEP		
6	10-6303	Dep.; $0.20(OTS)
22	10-6135	Dep.; $0.20(OTS)
32	10-9800	Dep.; $0.20(OTS)
33	10-5294	Dep.; $0.15(OTS)
54	10-3818	Dep.; $0.20(OTS)
85	10-6304	Dep.; $0.20(OTS)
90	10-4666	Dep.; $0.15(OTS)
91	10-3819	Dep.; $0.15(OTS)
113	10-1815	Dep.; $0.30(OTS)
118	10-4046	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
123	10-1816	Dep.; $0.25(OTS)
127	10-3362	Dep.; $0.30(OTS)
128	10-4047	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
138	10-9801	Dep.; $0.25(OTS)
149	10-3013	Dep.; $0.30(OTS)
184	10-854	Dep.; $0.25(OTS)
SO		
2043	10-996	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2044	10-3134	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2045	10-3286	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2046	10-3821	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2047	10-6710	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2048	10-11842	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2523	10-188	Dep.(mc); $4.80 (ph OTS); $2.70 (mf OTS)
2524	10-4048	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3002	10-5295	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3003	10-3613	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3005	10-3614	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3257	10-5843	Nucleonics 13, No. 3, 66, 68, 70 & 72(1956)
SOA		
185	10-5128	See NYO-7522
186	10-5128	See NYO-7522
SOD		
10	10-6163	See AECD-4091
SOO		
2	10-4128	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
Spec.		
49	10-3750	See RL-16.6.49
SR		
119	10-2797	See AECD-3726

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SUI		
55-9	10-2097	Phys. Rev. 100, 1460-7(1955)
55-10	10-5765	Phys. Rev. 101, 1142-8(1956)
T		
169	10-4372	See AECD-4016
1097	10-10868	See AECD-3783
TE-8		
3-1	10-4324	See AECD-3781
TEI		
2	10-7122	See A-1064
229	10-8393	Calif. Dept. Nat. Resources. Div. Mines. Spec. Report No. 49; $0.50
261	10-7673	U. S. Geol. Survey Bull. 1009-K; $0.65 (GPO)
295	10-11821	U. S. Geol. Survey Bull. 1032-B, 1956
336A	10-151	Dep.; $0.20 (OTS)
380	10-161	U. S. Geol. Survey Bull. 1021-C(1955); (GPO)
384	10-11820	U. S. Geol. Survey Bull. 1030-F, 1956; $0.50(GPO)
460	10-11061	Anal. Chem. 28, 1402-7(1956)
444	10-6680	U. S. Geol. Survey Bull. 1036-E(1956); $0.15(GPO)
454	10-4632	Am. Mineralogist 41, 82-90(1956)
455	10-1786	Am. Mineralogist 40, 1004-21(1955)
457	10-7671	Am. Mineralogist 41, 187-201(1956)
459	10-4634	Am. Mineralogist 41, 157-61(1956)
465	10-4631	Am. Mineralogist 41, 76-81(1956)
468	10-2065	Dep.; $0.35(OTS)
472	10-821	Econ. Geol. 50, 447-58(1955)
474	10-4633	Am. Mineralogist 41, 127-33(1956)
475	10-9294	Geochim. et Cosmochim. Acta 9, 98-102 (1956)
479	10-152	Dep.; $0.30 (OTS)
493	10-9293	Am. J. Sci. 254, 316-24(1956)
499	10-8308	Bull. Geol. Soc. Amer. 67, 395-404(1956)
501	10-10091	Bull. Am. Assoc. Petroleum Geol. 40, 909-17(1956)
502	10-9179	U. S. Geol. Survey Bull. 1036-F, 1956; $0.15(GPO)
504	10-10172	Econ. Geol. 50, 464-533(1955)
507	10-2066	Dep.; $0.30(OTS)
508	10-10174	Am. Mineralogist 41, 539-68(1956)
525	10-3192	Dep.; $0.25(OTS)
538	10-11829	Am. Mineralogist 41, 675-88(1956)
540	10-2067	Dep.; $1.50(OTS)
543	10-11077	Anal. Chim. Acta 15, 141-4(1956)
544	10-11717	Anal. Chim. Acta 15, 288-91(1956)
555	10-5526	Dep.; $0.20(OTS)
567	10-8394	Econ. Geol. 51, 213-22(1956)
571	10-9154	Anal. Chem. 28, 812-16(1956)
575	10-10169	U. S. Geol. Survey Bull. 1036-G, 91-153(1956) $0.25(GPO)
590	10-10166	Dep.; $1.50(OTS)

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TEM		
629	10-10168	U. S. Geol. Survey Bull, 1030-E, 149-69(1956); $0.25(GPO)
645	10-160	U. S. Geol. Survey Bull. 1009-H(1955); $0.40 (GPO)
694	10-7675	Available from U. S. Geol. Survey as Geological Quadrangle Map GQ-71
693	10-157	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-61
695	10-158	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-68
696	10-1359	Available from U. S. Geol. Survey, as Geological Quadrangle Map GQ-55
697	10-154	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-59
698	10-155	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-69
700	10-156	Available from U. S. Geol. Survey, as Geologic Quadrangle Map GQ-66
701	10-5640	Available from U. S. Geol. Survey as Geological Quadrangle Map GQ-81.
706	10-9297	Available from U. A. Geological Survey as Geologic Quadrangle Map GQ-83
707	10-5639	Available from U. S. Geol. Survey, as Geological Quadrangle Map GQ-78.
742	10-10171	U. S. Geol. Survey Bull. 1042-B, 25-44(1956); $0.15(GPO)
862	10-7672	Am. Mineralogist 41, 363-66(1956)
874-A	10-3007	Dep.; $0.20(OTS)
915	10-5631	Dep.; $0.35(OTS)
917	10-153	Dep.; $0.15 (OTS)
929	10-6667	Dep.; $0.30(OTS)
1000	10-11822	U. S. Geol. Survey Bull. 1046-A, 1956; $0.15(GPO)
TID		
256	10-3958	Dep.; $0.55(OTS)
270	10-5429	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
271	10-5104	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
355	10-5438	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3010(Suppl.2)	10-2726	Dep.; $0.30(OTS)
3043(Suppl.2)	10-502	Dep.; $0.25(OTS)
3044(Suppl.1)	10-2727	Dep.; $1.50(OTS)
3053	10-3053	Dep.; $0.35(OTS)
3061	10-4508	Dep.; $0.15(GPO)
3301	10-11843	Dep.; $0.25(OTS)
3302	10-10163	Dep.; $0.30(OTS)
3303	10-10668	Dep.; $0.20(OTS)
3304	10-10196	Dep.; $0.30(OTS)
5018	10-10991	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5020	10-6153	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5029	10-5409	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5046	10-5142	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5047	10-3231	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5048	10-3731	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5049	10-4455	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5050	10-3232	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5051	10-3233	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)

Report	Abstract	Availability
TID		
5052	10-4456	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5054	10-3042	Dep.; $0.35(OTS)
5055	10-3213	Dep.; $0.15(OTS)
5057	10-3234	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5063	10-7228	Dep.; $0.10(OTS)
5072	10-5410	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5087	10-3376	Dep.; $0.25(OTS)
5101	10-6246	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5116	10-3363	Dep.; $1.00(OTS)
5117	10-885	Dep.; $0.25(OTS)
5140	10-3188	Dep.; $0.25(OTS)
5162	10-10885	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
5163	10-10886	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
5164	10-10887	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
5166	10-10888	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5167	10-10889	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5196	10-10775	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5181	10-6453	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5184	10-3014	Dep.; $0.60(OTS)
5194	10-5145	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
5198	10-10776	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5208	10-6454	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5212	10-1817	Dep.; $1.00(OTS)
5213	10-3162	Dep.; $1.15(OTS)
5214	10-3140	Dep.; $2.65(OTS)
5215	10-926	Dep.; $1.45(OTS)
5216	10-927	Dep.; $1.85(OTS)
5217	10-1863	Dep.; $2.65(OTS)
5218	10-938	Dep.; $1.85(OTS)
5219	10-3210	Dep.; $1.50(OTS)
5221	10-8037	Dep.; $1.75(OTS)
5241	10-6112	Dep.; $0.20(OTS)
5242	10-5120	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5244	10-6150	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5249	10-10890	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5259	10-613	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
5274	10-8904	Dep.; $0.15(OTS)
5280(Suppl.1)	10-2024	Dep.; $0.60(OTS)
5292	10-2168	Dep.; $0.45(OTS)
5300	10-1520	Dep.; $1.75(GPO)
5315(Vols. I and II)	10-3961	Dep.
5327	10-6711	Dep.; $0.25(OTS)
5360	10-9967	Dep.; $0.45(OTS)
5365	10-11844	Dep.; $0.25(OTS)
7001	10-1928	Dep.; $2.45(OTS)
7002	10-4534	Dep.; $0.60(OTS)
7004	10-3318	$2.10(OTS)
7506(Pt. I)	10-10528	Dep.; $1.25(OTS)
7508	10-3790	Dep.; $0.40(OTS)
7513(Pt.1)	10-7429	Dep.; $1.50(OTS)
7515(Pt. I)	10-10068	Dep.; $0.35(OTS)
8001	10-1170	Dep.; $0.15(OTS)
8002	10-2579	Dep.; $0.20(OTS)
8003	10-3043	Dep.; $0.20(OTS)
8004	10-3128	Dep.; $0.20(OTS)
8005	10-3179	Dep.; $0.15(OTS)
8006	10-3301	Dep.; $0.20(OTS)
8007	10-3256	Dep.; $0.15(OTS)
8008	10-3169	Dep.; $0.15(OTS)
8009	10-3235	Nucleonics 14, No. 3, 45-7(1956)
8010	10-3876	Dep.; $0.45(OTS)
8011	10-4575	Dep.; $0.20(OTS)
8012	10-6712	Dep.; $0.15(OTS)
8013	10-9328	Dep.; $0.20(OTS)
10102	10-9886	Dep.; $0.40(OTS)
TLE		
990-723	10-10885	See TID-5162
990-972	10-10886	See TID-5163
990-1063	10-10887	See TID-5164
990-1292	10-10888	See TID-5166
990-1381	10-10889	See TID-5167
TM		
20-55-51	10-9778	See AECU-3218
21-54-53	10-10880	See AECU-3239
34-55-51	10-8906	See AECU-3209
46-53-12	10-9803	See AECU-3201
46-55-54	10-9806	See AECU-3213
70-53-15	10-9727	See AECU-3214
73-55-54	10-8924	See AECU-3210
76-53-15	10-10871	See AECU-3208
77-53-52	10-10878	See AECU-3234
92-55-51	10-10860	See AECU-3217
94-53-54	10-9804	See AECU-3232
102-55-55	10-10870	See AECU-3202
104-53-51	10-10876	See AECU-3231
104-55-54	10-10877	See AECU-3233
113-54-51	10-10863	See AECU-3228
114-54-51	10-10861	See AECU-3221
138-55-51	10-8925	See AECU-3211
157-55-51	10-8918	See AECU-3205
159-55-51	10-10873	See AECU-3216
188-55-16	10-9805	See AECU-3206
192-54-53	10-10875	See AECU-3229
196-54-51	10-10879	See AECU-3238
220-53-15	10-10874	See AECU-3226
225-54-51	10-9818	See AECU-3204
233-54-51	10-8907	See AECU-3212
267-54-51	10-10862	See AECU-3227
270-54-51	10-10872	See AECU-3215
275-54-51	10-8905	See AECU-3207
TOW		
57-3-1A	10-8666	See NYO-4720
TVA		
1	10-4192	See RMO-2701

Report	Abstract	Availability
TVA		
5	10-4196	See RMO-2705
UCLA		
30	10-3351	Dep.; $0.25(OTS)
64(Pt. I)	10-5085	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
64(Pt. II)	10-5086	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
199	10-7290	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
250	10-5087	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
286	10-5088	Dep.(mc); $18.30(ph OTS); $6.00(mf OTS)
330	10-956	Am. J. Roentgenol. Radium Therapy Nuclear Med. 75, 1169-73(1956); Dep.; $0.20(OTS)
326	10-1693	Dep.; $0.25(OTS)
337	10-2973	J. Biol. Chem. 218, 911-19(1956)
343	10-581	Dep.; $0.20(OTS)
344	10-1329	Dep.; $0.15(OTS)
345	10-6103	Dep.(mc); $16.80(ph OTS); $5.40(mf OTS)
346	10-2	J. Appl. Phys. 27, 577-82(1956)
347	10-507	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
348	10-517	Science 123, 1020-22(1956)
349	10-554	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
350	10-555	Soil Sci. 81, 359-69(1956); Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
351	10-508	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
352	10-509	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
353	10-2993	Dep.; $0.20(OTS)
354	10-3834	Dep.; $0.25(OTS)
355	10-1153	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
356	10-2671	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
358	10-8157	Proc. Soc. Expt. Biol. Med. 91, 438-40 (1956)
359	10-2967	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
360	10-3184	Dep.; $3.30(ph OTS); $2.40(mf OTS)
361	10-3328	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
363	10-3770	Dep.; $3.30(ph OTS); $2.40(mf OTS)
364	10-3776	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
365	10-3881	Dep.; $3.30(ph OTS); $2.40(mf OTS)
366	10-3901	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
367	10-3969	Dep.; $3.30(ph OTS); $2.40(mf OTS)
368	10-3997	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
369	10-4518	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
370	10-6463	Dep.; $0.45(OTS)
372	10-7381	Dep.; $4.80(ph OTS); $2.70(mf OTS)
373	10-7382	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
374	10-7448	Dep.; $0.40(OTS)
375	10-9033	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
376	10-9103	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
UCP		
1	10-8784	See AECD-3912
2	10-6144	See AECD-3913
6	10-7142	See AECD-3914
14	10-9734	See AECD-3915

Report	Abstract	Availability
UCRL		
78	10-2353	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
96	10-2499	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS
111	10-2488	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
114	10-2551	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
116	10-3663	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
126	10-2332	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
130	10-3664	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
132	10-2500	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
139	10-2501	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
140	10-2502	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
184	10-2466	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
196	10-3566	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
206	10-5348	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
226	10-2354	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
264	10-6160	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
329	10-5185	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
449	10-6353	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
585	10-6193	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
633	10-2344	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
649	10-7229	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
718	10-7169	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
778	10-6194	Dep.; $0.20(OTS)
764	10-2333	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
840	10-6442	Dep.; $0.15(OTS)
861	10-3496	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
923	10-6113	Dep.(mc); $12.30(ph OTS); $4.50(mf OTS)
1094	10-6305	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1169	10-6195	Dep.; $0.45(OTS)
1173	10-1584	Dep.(mc); $28.80(ph OTS); $8.40(mf OTS)
1244(Rev.)	10-7305	Dep.; $0.30(OTS)
1280	10-2503	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1294	10-2334	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1365	10-6114	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1369	10-11537	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1394	10-10981	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1434(Rev.)	10-5146	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1493	10-6196	Dep.; $0.20(OTS)
1558	10-6197	Dep.(mc); $13.80(ph OTS); $4.80(mf OTS)
1632	10-6115	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1633	10-7349	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
1715	10-5414	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
1723	10-10777	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
1770	10-6116	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
1830(Rev.)	10-4460	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1865	10-9639	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
1878	10-6117	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2069	10-5105	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
2179(Suppl.)	10-2461	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2184	10-9893	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
2203	10-5412	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2246	10-5413	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2255(Rev.)	10-8703	Phys. Rev. 102, 473-85(1956)

Report	Abstract	Availability
UCRL		
1297	10-10982	Dep.; $0.25(OTS)
2345(suppl.)	10-6097	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2539	10-5342	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
2589	10-1207	J. Am. Chem. Soc. 77, 5948-57(1955)
2595(Rev.)	10-6817	Phys. Rev. 102, 1632-6(1956)
2672	10-1585	Dep.; $0.50(OTS)
2674	10-726	Dep.; $0.15(OTS)
2755	10-2031	J. Chem. Phys. 23, 1750-6(1955)
2797	10-1869	J. Chem. Phys. 23, 1629-30(1955)
2799(Rev.)	10-5906	Phys. Rev. 101, 1110-15(1956)
2808	10-1090	Dep.; $0.45(OTS)
2816	10-2768	J. Chem. Phys. 23, 1826-9(1955)
2854(Rev.)	10-1896	Dep.; $1.80(ph OTS); $1.80(mf OTS)
2879	10-1859	Dep.; $0.35(OTS)
2884	10-1130	Dep.; $1.50(OTS)
2923	10-261	Rev. Sci. Instr. 26, 954-8(1955)
2945	10-1862	Electronics 28, No. 11, 218-220(1955).
2950	10-454	Phys. Rev. 100, 137-42(1955)
2958	10-5453	Ann. Rev. Nuclear Sci. 5, 327-68(1955)
2959	10-496	Phys. Rev. 100, 372-5(1955)
2964	10-9419	J. Phys. Chem. 60, 4435(1956)
2974(Rev.)	10-6039	Phys. Rev. 101, 746-50(1956)
2975(Rev.)	10-7049	Phys. Rev. 102, 1659-75(1956)
2980	10-2206	Phys. Rev. 100, 1403-6(1955)
2982	10-1632	Phys. Rev. 100, 905-11(1955)
2991	10-1524	Phys. Rev. 100, 844(1955)
2997	10-4741	Phys. Rev. 101, 922-34(1956)
3002	10-5776	J. Inorg. and Nuclear Chem. 2, 66-8(1956)
3033	10-1081	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3034	10-494	Phys. Rev. 100, 240-1(1955)
3040	10-12104	Phys. Rev. 103, 1298-1308(1956)
3041	10-285	Nuovo cimento (10), 2, 344-5(1955)
3053	10-2191	Phys. Rev. 100, 1445-7(1955)
3054	10-1126	J. Chem. Phys. 23, 1956-7(1955)
3057	10-4109	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3072	10-1217	Dep.; $0.20(OTS)
3073	10-4734	Acta Cryst. 8, 842(1955)
3077	10-5926	Phys. Rev. 101, 655-62(1956)
3083	10-283	Phys. Rev. 100, 430-1(1955)
3084	10-1447	Dep.; $0.15(OTS)
3087(Rev.)	10-8700	Phys. Rev. 102, 251-61(1956)
3089	10-5018	Phys. Rev. 101, 451-2(1956)
3093	10-10592	Phys. Rev. 103, 704-13(1956)
3094	10-1467	Dep.; $0.55(OTS)
3095	10-4977	Phys. Rev. 101, 324-8(1956)
3097	10-5923	Phys. Rev. 101, 636-44(1956)
3098	10-490	Phys. Rev. 103, 425-34(1956) (Revised and and Condensed); Dep.; $19.80(ph OTS); $6.30(mf OTS)
3099	10-4831	Phys. Rev. 101, 358-9(1956)
3100	10-7044	Phys. Rev. 101, 1588-96(1956)
UCRL		
3101	10-2185	Science 122, 1127-32(1955)
3106	10-5934	Phys. Rev. 101, 807-13(1956)
3109	10-6076	Phys. Rev. 101, 874-6(1956)
3111	10-6077	Phys. Rev. 101, 877-9(1956)
3113	10-7638	Iron Age 176, No. 17, 85-7(1956)
3115	10-1009	Dep.; $9.30(ph OTS); $3.60(mf OTS)
3132	10-582	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3135	10-787	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
3136	10-919	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3138	10-222	Dep.; $0.20(OTS)
3141	10-1154	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3144	10-583	J. Phys. Chem. 60, 947-9(1956); Dep.; $0.20(OTS)
3145	10-3	Proc. Soc. Exptl. Biol. Med. 90, 463-6 (1955)
3146	10-5993	Phys. Rev. 101, 1016-20(1956)
3147	10-5867	Phys. Rev. 101, 778-95(1956)
3149	10-4869	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3150	10-1586	Dep.; $0.20(OTS)
3153	10-1082	Rev. Sci. Instr. 27, 485-90(1956); Dep.; $3.30(ph OTS); $2.40(mf OTS)
3154	10-1448	Dep.; $12.30(ph OTS); $4.50(mf OTS)
3156	10-979	Nuovo cimento (10) 3, 85-93(1956)
3157	10-1729	Dep.; $0.50(OTS)
3165	10-4840	Phys. Rev. 101, 503-5(1956)
3166	10-6085	Phys. Rev. 101, 1206-7(1956)
3167	10-5953	Phys. Rev. 101, 1406-9(1956)
3168	10-10399	Phys. Rev. 103, 254-7(1956)
3169	10-629	Dep.; $0.20(OTS)
3172	10-1510	Phys. Rev. 100, 947-50(1955)
3173	10-3204	Dep.; $0.25(OTS)
3176	10-1948	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3178	10-1218	Dep.; $0.15(OTS)
3179	10-1468	Rev. Sci. Instr. 27, 334-6(1956); Dep.; $1.80(ph OTS); $1.80(mf OTS)
3182	10-5905	Phys. Rev. 101, 911-13(1956)
3184	10-3045	Dep.; $0.25(OTS)
3185	10-1939	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3186	10-9628	Phys. Rev. 102, 862-6(1956)
3187	10-1587	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3189	10-4857	Phys. Rev. 101, 498-501(1956)
3190	10-2639	Dep.; $0.35(OTS)
3191	10-1694	Dep.; $0.25(OTS)
3192	10-9659	Phys. Rev. 102, 905-13(1956)
3195	10-3205	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3202	10-6079	Phys. Rev. 101, 910-11(1956)
3203	10-2571	Dep.; $0.25(OTS)
3208	10-1696	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3209	10-3116	Dep.; $10.80(ph OTS); $3.90(mf OTS)
3210	10-3031	Dep.; $0.15(OTS)
3211	10-3047	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3212	10-2181	Dep.; $0.25(OTS)

Report	Abstract	Availability
UCRL		
3213	10-2628	Dep.; $12.30(ph OTS); $4.50(mf OTS)
3214	10-9231	Dep.; $0.15(OTS)
3215	10-2103	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3216	10-4862	Nature 177, 11-12(1956)
3217	10-7547	J. Chem. Phys. 24, 631-2(1956)
3218	10-3046	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3219	10-9562	Phys. Rev. 102, 747-8(1956)
3223	10-3222	Dep.; $7.80(ph OTS); $3.30(mf OTS)
3224	10-5904	Phys. Rev. 101, 909-10(1956)
3226	10-5875	Phys. Rev. 101, 1212-14(1956)
3228	10-2572	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3236	10-3239	Dep.; $4.80(ph OTS); $2.70(mf OTS)
3237	10-3206	Dep.; $0.15(OTS)
3238	10-10492	Phys. Rev. 103, 748-50(1956)
3239	10-9590	Phys. Rev. 102, 1372-7(1956)
3240	10-3104	Dep.; $0.50(OTS)
3242	10-3098	Dep.; $0.25(OTS)
3243	10-9626	Phys. Rev. 102, 766(1956)
3244	10-6920	Phys. Rev. 101, 1617-18(1956)
3247	10-3164	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3250	10-3240	Rev. Sci. Inst. 27, 493-503(1956); Dep.; $0.30(OTS)
3254	10-8574	Phys. Rev. 102, 583-4(1956)
3259	10-3878	Dep.(mc); $0.50(OTS)
3260	10-10400	Phys. Rev. 103, 258-61(1956)
3265	10-3791	J. Inorg. and Nuclear Chem. 3, 153-4; Dep.; $1.80(ph OTS); $1.80(mf OTS)
3266	10-3246	Dep.; $0.35(OTS)
3268	10-3165	Dep.; $0.40(OTS)
3270	10-8324	J. Chem. Phys. 24, 1115-16(1956)
3271	10-3215	Phys. Rev. 102, 1420-1(1956)
3272	10-7047	Phys. Rev. 102, 1626-31(1956)
3273	10-3241	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3274	10-3303	Dep.; $12.30(ph OTS); $4.50(mf OTS)
3275	10-3846	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3280	10-9236	J. Am. Chem. Soc. 78, 2340(1956)
3281	10-3320	Dep.; $10.80(ph OTS); $3.90(mf OTS)
3284	10-3847	Nuovo cimento (10) 4, 240-53(1956); Dep.; $4.80(ph OTS); $2.70(mf OTS)
3286	10-10470	Phys. Rev. 103, 147-8(1956)
3288	10-3207	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3289	10-3848	Dep.; $0.15(OTS)
3291	10-3304	Nuovo cimento (10) 4, 51-8(1956); Dep.; $0.20(OTS)
3294	10-3308	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3295	10-3305	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3296	10-9532	Phys. Rev. 102, 925-6(1956)
3302	10-7046	Phys. Rev. 102, 1622-6(1956)
3304	10-11546	Phys. Rev. 103, 975-82(1956)
3310	10-4017	Anal. Chem. 28, 1304-8(1956); Dep.; $0.25(OTS)
3314	10-3216	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3317	10-3272	J. Am. Chem. Soc. 78, 4554-5(1956); Dep.; $0.15(OTS)
3321	10-10366	Phys. Rev. 103, 208-10(1956)
3322	10-10304	Dep.; $15.30(ph OTS); $5.40(mf OTS)
3323	10-9507	Phys. Rev. 102, 927-8(1956)
3324	10-3792	J. Inorg. and Nuclear Chem. 3, 49-53 (1956); Dep.; $0.15(OTS)
3325	10-9531	Phys. Rev. 102, 921-3(1956)
3326	10-3854	Dep.; $0.30(OTS)
3327	10-6975	Phys. Rev. 102, 1637-40(1956)
3328	10-3772	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3330	10-3952	Dep.; $12.30(ph OTS); $4.50(mf OTS)
3331	10-3985	Dep.; $0.20(OTS)
3332	10-8018	Dep.; $6.30(ph OTS); $3.00(mf OTS)
3334	10-3953	Dep.; $18.30(ph OTS); $6.00(mf OTS)
3337	10-6093	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3338	10-4000	Dep.; $0.25(OTS)
3339	10-11390	Phys. Rev. 103, 1102-7(1956)
3340	10-9511	Phys. Rev. 102, 1187-8(1956)
3341	10-9238	J. Chem. Phys. 24, 1275(1956)
3349	10-3963	Dep.; $0.30(OTS)
3350	10-3964	Dep.; $0.25(OTS)
3351	10-6532	Dep.; $0.45(OTS)
3352	10-4035	Dep.; $0.15(OTS)
3353	10-4600	Dep.; $0.60(OTS)
3355	10-3899	Dep.; $0.20(OTS)
3357	10-6829	Dep.; $0.25(OTS)
3358	10-3914	Dep.; $0.10(OTS)
3360	10-4519	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3366	10-4110	Dep.; $0.15(OTS)
3368	10-4817	Dep.; $9.30(ph OTS); $3.60(mf OTS)
3374	10-9519	Dep.; $0.50(OTS)
3376	10-6464	Dep.; $0.20(OTS)
3383	10-4818	Dep.; $7.80(ph OTS); $3.30(mf OTS)
3386	10-4481	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3388	10-4870	Dep.(mc); $15.30(ph OTS); $5.40(mf OTS)
3396	10-4520	Biochim. et Biophys. Acta 21, 376-7(1956); Dep.; $1.80(ph OTS); $1.80(mf OTS)
3398	10-6465	Dep.; $0.20(OTS)
3399	10-12077	Phys. Rev. 103, 1502-11(1956)
3422	10-10060	Dep.; $13.80(ph OTS); $4.80(mf OTS)
3427	10-10598	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3441	10-5993	See UCRL-3146 (Published Version)
3451	10-11602	Dep.; $0.20(OTS)
3462	10-10599	Dep.; $1.80(ph OTS); $1.80(mf OTS)
3464	10-10600	Dep.; $3.30(ph OTS); $2.40(mf OTS)
3479	10-11608	Dep.; $0.25(OTS)
4146	10-10255	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4461	10-10601	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4466(Pt. I)	10-10256	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
4466(Pt. IV)	10-10257	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4510	10-10258	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4511	10-4746	Phys. Rev. 101, 280-2(1956)

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UCRL		
4549	10-10259	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
4564	10-6974	Phys. Rev. 102, 1621(1956)
4626	10-10586	Phys. Rev. 103, 378-85(1956)
4639	10-4856	Dep.; $0.45(OTS)
4640	10-10405	Phys. Rev. 103, 671-3(1956)
4644	10-10472	Phys. Rev. 103, 186-9(1956)
4647	10-10368	Phys. Rev. 103, 248-9(1956)
4663	10-11915	Phys. Rev. 103, 1150-4(1956)
4688	10-4740	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
3407	10-5444	$0.25(OTS)
3410	10-8469	Dep.; $0.30(OTS)
3411	10-7873	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
3412	10-9649	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
3413	10-5900	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
3414	10-7934	Dep.; $0.20(OTS)
3415	10-9123	Dep.; $0.45(OTS)
3419	10-9617	Dep.; $12.30(ph OTS); $4.50(mf OTS)
3460	10-9104	Dep.; $0.20(OTS)
3463	10-11538	Dep.; $0.30(OTS)
4266	10-2173	Dep.; $0.25(OTS)
4454	10-382	Dep.; $1.80 (ph OTS); $1.80 (mf OTS)
4466(pt.III) (Del.))	10-9420	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4502	10-5755	Phys. Rev. 100, 1007-8(1955)
4505	10-2239	Phys. Rev. 100, 1284-6(1955)
4506	10-2240	Phys. Rev. 100, 1286-93(1955)
4516	10-1872	Dep.; $4.80(ph OTS); $2.70(mf OTS)
4517	10-9686	Phys. Rev. 102, 805-7(1956)
4526	10-1125	J. Chem. Phys. 23, 1956(1955)
4531	10-893	Dep.; $1.80(ph OTS); $1.80(mf OTS)
4540	10-943	Dep.; $3.30(ph OTS); $2.40(mf OTS)
4547	10-236	Dep.; $0.20 (OTS)
4555	10-7966	Phys. Rev. 101, 1804-5(1956)
4557	10-910	J. Phys. Chem. 60, 821-3(1956)
4559	10-928	Rev. Sci. Instr. 27, 575-80(1956); Dep.; $4.80(ph OTS); $2.70(mf OTS)
4560	10-1853	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4563	10-1412	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
4565	10-11374	Nucleonics 14, No. 8, 90-5(1956)
4581	10-8632	Phys. Rev. 102, 182(1956)
4588	10-3225	Dep.; $0.25(OTS)
4607	10-9633	Phys. Rev. 102, 1390-2(1956)
4610	10-9232	J. Am. Chem. Soc. 78, 2467-8(1956)
4616	10-9535	Phys. Rev. 102, 1084-92(1956)
4617	10-9536	Phys. Rev. 102, 1093-7(1956)
4622	10-3236	J. Appl. Phys. 27, 1030-1(1956); Dep.; $3.30(ph OTS); $2.40(mf OTS)
4628	10-3137	Dep.; $0.15(OTS)
4629	10-3287	Dep.; $0.15(OTS)
4632	10-7970	Phys. Rev. 101, 1832-3(1956)
4641	10-3221	Dep.; $3.30(ph OTS); $2.40(mf OTS)
4666	10-4066	Dep.; $0.15(OTS)
4695	10-5778	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
4699	10-6062	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
4704	10-7813	Dep.; $0.20(OTS)
4707	10-11042	Dep.; $0.25(OTS)
UCRL-Trans		
241	10-10553	Dep.(mc); JCL
242	10-336	Dep.(mc); JCL
243	10-277	Dep.(mc); JCL
246	10-1509	Dep.(mc); JCL
248	10-1621	Dep.(mc); JCL
253	10-2949	Dep.(mc); JCL
257	10-3036	Dep.(mc); JCL
UCSF		
12	10-3166	Dep.; $10.80(ph OTS); $3.90(mf OTS)
UN-TR		
2	10-7558	See AECD-3725
3	10-5565	See AECU-3137
UR		
295	10-1983	Dep.; $6.30(ph OTS); $3.00(mf OTS)
296	10-19	Dep.; $3.30 (ph OTS); $2.40 (mf OTS)
302	10-1776	Dep.; $16.80(ph OTS); $5.70(mf OTS)
305	10-614	Dep.; $13.80(ph OTS); $4.80(mf OTS)
381	10-957	Dep.; $0.60(OTS)
397	10-545	Dep.; $18.30(ph OTS); $6.00(mf OTS)
399	10-2243	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
403	10-20	Brit. J. Radiol. 29, 169-71(1956)
404	10-4	Dep.; $7.80 (ph OTS); $3.30 (mf OTS)
411	10-548	Dep.; $3.30(ph OTS); $2.40(mf OTS)
414	10-556	Dep.; $3.30(ph OTS); $2.40(mf OTS)
415	10-1982	Dep.; $6.30(ph OTS); $3.00(mf OTS)
416	10-3257	Dep.; $3.30(ph OTS); $2.40(mf OTS)
417	10-3097	Dep.; $1.80(ph OTS); $1.80(mf OTS)
418	10-1984	Dep.; $3.30(ph OTS); $2.40(mf OTS)
421	10-3099	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
422	10-3096	Dep.; $3.30(ph OTS); $2.40(mf OTS)
423	10-3092	Dep.; $33.30(ph OTS); $9.60(mf OTS)
426	10-2974	Dep.; $1.80(ph OTS); $1.80(mf OTS)
427	10-3258	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
428	10-3100	J. Gen Physiol. 39, 625-49(1956)
429	10-3259	Dep.; $3.30(ph OTS); $2.40(mf OTS)
430	10-3168	Dep.; $6.30(ph OTS); $3.00(mf OTS)
431	10-3260	Dep.; $1.80(ph OTS); $1.80(mf OTS)
433	10-3253	Dep.; $6.30(ph OTS); $3.00(mf OTS)
434	10-3255	Dep.; $4.80(ph OTS); $2.70(mf OTS)
435	10-5449	Dep.; $3.30(ph OTS); $2.40(mf OTS)
436	10-3898	Dep.; $3.30(ph OTS); $2.40(mf OTS)
438	10-6466	Dep.; $6.30(ph OTS); $3.00(mf OTS)
439	10-4794	Dep.; $4.80(ph OTS); $2.70(mf OTS)
440	10-3771	Dep.; $3.30(ph OTS); $2.40(mf OTS)
441	10-4482	Dep.; $7.80(ph OTS); $3.30(mf OTS)
442	10-4483	Dep.; $7.80(ph OTS); $3.30(mf OTS)

Report	Abstract	Availability
UR		
443	10-8138	Dep.; $1.80(ph OTS); $1.80(mf OTS)
444	10-6467	Dep.; $4.80(ph OTS); $2.70(mf OTS)
445	10-9923	Dep.; $3.30(ph OTS); $2.40(mf OTS)
447	10-6516	Dep.; $4.80(ph OTS); $2.70(mf OTS)
449	10-7398	Dep; $3.30(ph OTS); $2.40(mf OTS)
450	10-5503	Dep.; $3.30(ph OTS); $2.40(mf OTS)
451	10-6468	Dep.; $1.80(ph OTS); $1.80(mf OTS)
452	10-6494	Dep.; $3.30(ph OTS); $2.40(mf OTS)
453	10-7874	Dep.; $3.30(ph OTS); $2.40(mf OTS)
454	10-7443	Dep.; $3.30(ph OTS); $2.40(mf OTS)
455	10-8139	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
460	10-8163	Dep.; $4.80(ph OTS); $2.70(mf OTS)
461	10-11253	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
462	10-11609	Dep.; $1.80(ph OTS); $1.80(mf OTS)
USBM-U		
3	10-1390	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
42	10-858	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
57	10-859	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
WAPD		
21	10-2467	Dep.(mc); $24.30(ph OTS); $7.50(mf OTS)
25	10-1399	Dep.; $0.20(OTS)
31	10-5422	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
60	10-7291	Dep.; $0.25(OTS)
76	10-781	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
77	10-2194	Dep.; $0.20(OTS)
79	10-2918	Dep.; $0.25(OTS)
84	10-3615	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
114	10-6929	Dep.; $0.50(OTS)
128	10-3151	Dep.; $0.25(OTS)
129	10-2084	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
131	10-1822	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
134	10-3403	Dep.; $0.60(OTS)
143	10-4049	Dep.; $0.35(OTS)
146	10-3839	Dep.; $0.25(OTS)
149	10-12028	Dep.; $0.30(OTS)
151	10-6986	Dep.; $0.45(OTS)
153	10-4028	Dep.; $0.25(OTS)
WAPD-CE		
39	10-3951	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
41	10-3877	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
43	10-6987	
WAPD-CP		
622	10-10205	Dep.; $0.30(OTS)
1030	10-7350	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-CTA-IH		
87	10-4089	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
WAPD-FE		
1101	10-7269	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-LSR(P)		
30	10-6855	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-MM		
421	10-4267	See AECD-4017
538	10-3616	See AECD-3864
WAPD-P		
646	10-7081	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
657	10-7292	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
WAPD-PM		
31	10-10529	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
38	10-7288	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
WAPD-PWR-CP		
1717	10-10778	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
2231	10-10132	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
WAPD-RM		
7	10-7270	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
22	10-7230	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
36	10-7308	See AECD-4037
50	10-7355	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
122	10-4987	Dep.; $0.15(OTS)
154	10-9811	Dep.; $0.30(OTS)
186	10-10975	Dep.; $0.35(OTS)
188	10-7310	See AECD-4109
217	10-5001	Dep.; $0.20(OTS)
WAPD-SER-Rs		
444	10-5970	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-SFR-Fe		
192	10-1823	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
WAPD-SFR-PD		
107	10-5803	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-SFR-Ph		
124	10-5969	Dep.; $3.30(ph OTS); $2.40(mf OTS)
129	10-6277	See AECD-4076
187	10-6988	Dep.; $0.25(OTS)
WAPD-SR		
506(Vol.I)	10-11340	Dep.; $0.50(OTS)
506(Vol.II)	10-8527	Dep.; $0.50(OTS)
539	10-11784	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-STR(C)		
168	10-7835	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
WAPD-T		
20	10-3015	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
38 and Suppl.	10-3139	Dep.; $0.40(OTS)
46(Del.)	10-9802	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
206	10-8713	Dep.; $0.35(OTS)
260	10-11239	J. Metals 8, 1076-80(1956)
302	10-11165	Dep.(mc); $12.30(ph OTS); $4.80(mf OTS)
313	10-10530	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
382	10-11180	Dep.(mc); $3.30(ph OTS); $1.80(mf OTS)

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WAPD-TH		
138	10-7351	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
162	10-9887	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
180	10-8344	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
204	10-12030	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
WAPD-TM		
2	10-9606	Dep.; $0.35(OTS)
6	10-12031	Dep.; $0.30(OTS)
14	10-11846	Dep.; $0.20(OTS)
WAPD-TN		
520	10-3237	Dep.; $4.80(ph OTS); $2.70(mf OTS)
521	10-195	Dep.(mc); $6.30 (ph OTS); $3.00 (mf OTS)
522	10-1562	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
524	10-3372	Dep.; $0.25(OTS)
WASH		
275	10-2610	Dep.; $1.50(OTS)
291(Pt-1)	10-3029	Dep.; $1.00(OTS)
292(Pt.3, Suppl.1)	10-1563	Dep.; $0.20(OTS)
408	10-8340	Dep.; $0.20(OTS)
Web		
24-54A	10-6407	See IDO-16222
WIAP-M		
18	10-3249	Dep.; $1.80(ph OTS); $1.80(mf OTS)
31	10-8345	Dep.; $0.40(OTS)
WIN		
2	10-3273	Dep.; $0.30(OTS)
3	10-1322	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
5	10-1323	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
6	10-66	Dep.(mc); $6.30 (ph OTS); $3.00 (mf OTS)
11	10-3799	Dep.; $0.20(OTS)
12	10-1302	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
13	10-727	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
17	10-3344	Dep.; $0.25(OTS)
18	10-1303	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
23	10-67	Dep.; $0.25(OTS)
24	10-728	Dep.; $0.20(OTS)
25	10-587	Dep.; $0.25(OTS)
26	10-6595	Dep.; $0.25(OTS)
29	10-8287	Dep.; $0.30(OTS)
XAC-R		
188	10-3530	See AECD-3897
XAC-R		
373	10-5201	See AECD-3899
666	10-4220	See AECD-3946
819	10-6316	See AECD-4119
899	10-7179	See AECD-3878
XDC		
55-4-44	10-7979	See APEX-233
55-10-10	10-6690	See APEX-244
Y		
1	10-2455	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
27	10-2477	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
30	10-7231	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
32	10-2478	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
42	10-2570	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
63	10-3567	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
65	10-5311	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
87	10-3568	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
112	10-3569	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
149	10-3473	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
161	10-3570	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
164	10-3625	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
184	10-3571	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
226	10-5121	Dep.; $0.25(OTS)
228	10-3626	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
229	10-6198	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
235	10-5173	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
242	10-2473	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
243	10-2479	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
253	10-2335	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
256	10-6199	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
257	10-7232	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
260	10-6200	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
277	10-6201	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
279	10-5174	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
286	10-3572	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
287	10-3627	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
294	10-6202	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
299	10-3628	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
304	10-5175	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
310	10-5176	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
312	10-6203	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
314	10-6151	Dep.; $0.25(OTS)
315	10-3573	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
317	10-4320	Dep.; $0.20(OTS)
321	10-2460	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
327	10-6247	Dep.; $0.25(OTS)
328	10-2336	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)

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331	10-6248	Dep.; $0.20(OTS)
335	10-6204	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
341	10-5177	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
351	10-7233	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
352	10-3629	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
353	10-3630	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
361	10-8835	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
375	10-6205	Dep.(mc); $10.80(ph OTS); $3.90(mf OTS)
379	10-8836	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
381	10-3574	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
389	10-3737	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
390	10-3459	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
395	10-5122	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
396	10-6206	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
404	10-8837	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
407	10-3460	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
409	10-3575	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
411	10-2474	Dep.(mc); $7.80(ph OTS); $2.30(mf OTS)
414	10-3600	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
416	10-6207	Dep.(mc); $6.30(ph OTS); $3.30(mf OTS)
420	10-5178	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
431	10-3182	Dep.; $0.25(OTS)
440	10-6208	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
446	10-5179	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
449	10-2994	Dep.; $0.15(OTS)
453	10-6333	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
458	10-6209	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
461	10-4129	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
462	10-2267	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
463	10-2337	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
465	10-6136	Dep.; $0.25(OTS)
471	10-3580	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
475	10-2268	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
477	10-2995	Dep.; $0.30(OTS)
478	10-3576	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
480	10-6210	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
529	10-10895	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
532	10-7116	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
544	10-3631	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
545	10-2475	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
550	10-6326	Dep.(mc); $22.80(ph OTS); $7.20(mf OTS)
553	10-3135	Dep.; $0.20(OTS)
559	10-3793	Dep.; $0.25(OTS)
560	10-3274	Dep.; $0.40(OTS)
563	10-2476	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
565	10-6327	Dep.; $0.25(OTS)
573	10-3200	Dep.; $0.15(OTS)
589	10-3278	Dep.; $0.25(OTS)
602	10-3461	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
605	10-7117	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
611	10-2996	Dep.; $0.20(OTS)
612	10-3794	Dep.; $0.25(OTS)
638	10-7118	Dep.(mc); $9.30(ph OTS); $3.60(mf OTS)
644	10-7265	Dep.; $0.15(OTS)
645	10-6306	Dep.; $0.15(OTS)
652	10-3632	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
653	10-6328	Dep.(mc); $22.80(ph OTS); $7.20(mf OTS)
655	10-3633	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
659	10-6154	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
660	10-4334	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
685	10-4130	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
687	10-7119	Dep.(mc); $6.30(ph OTS); $3.00(mf OTS)
691	10-4365	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
697	10-7286	Dep.; $0.65(OTS)
700	10-4131	Dep.(mc); $3.40(ph OTS); $2.40(mf OTS)
703	10-4283	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
705	10-6323	Dep.; $0.20(OTS)
724	10-7120	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
734	10-4331	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
748	10-4335	Dep.(mc); $7.80(ph OTS); $3.30(mf OTS)
760	10-6430	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
762	10-4339	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
764	10-6118	Dep.; $0.25(OTS)
768	10-7121	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
769	10-6119	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
777	10-6329	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
817	10-3820	Dep.; $0.30(OTS)
824	10-3016	Dep.; $0.25(OTS)
825	10-4150	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
868	10-5296	Dep.; $0.20(OTS)
883	10-615	Dep.(mc); $3.30(ph OTS); $2.40(mf OTS)
1052	10-2736	Dep.; $0.20(OTS)
1087	10-2046	Dep.; $0.20(OTS)
1095	10-616	Dep.; $4.80(ph OTS); $2.70(mf OTS)
1096	10-84	Dep.; $0.15 (OTS)
1114	10-3027	Dep.; $0.25(OTS)
1134	10-7875	Dep.; $0.15(OTS)
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20-81	10-10779	Dep.(mc); $24.30(ph OTS); $7.50(mf OTS)
22-18	10-10892	Dep.(mc); $1.80(ph OTS); $1.80(mf OTS)
22-27	10-10893	Dep.(mc); $4.80(ph OTS); $2.70(mf OTS)
31-309	10-4141	See AECD-4015
31-344	10-6121	See AECD-4062
33-33	10-6106	See AECD-4054
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10-101	10-5344	See AECD-4053
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10-112	10-3685	See AECD-3994
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12	10-3686	See CF-46-6-23

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3-R-72R (Rev.A)	10-6030	See NARF-55-34T(Rev.A)
55-RL-1356	10-5666	
2173(WEC)	10-8395	
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2215(WEC)	10-7687	
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55	10-7617	
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6459	10-6649	See WADC-TR-52-106
13194	10-10287	See HE-150-101
13795	10-563	See BM-3289
15593	10-11837	See NAVORD-2038
27292	10-11800	See WADC-TR-53-265
24306	10-9230	See NBS-2812
27590	10-8341	See WADC-TR-322
28714	10-756	
31941	10-8359	
33170	10-6830	
33351	10-584	See WADC-TR-52-5(Suppl.2)
33366	10-4649	See CAL-KB-868-M-5
33965	10-4699	See RIA-54-1989
35659	10-823	
35867	10-7744	See RAE-Trans-455
35954	10-6682	
36320	10-2069	
36901	10-2732	See WADC-TR-53-510(Pt.I)
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37053	10-7796	See NM-001-059.13.07
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48382	10-1752	
48701	10-6860	See NML-5115-B-19.15(Pt.4)
48907	10-7647	See WADC-TR-53-9(Pt.2)
49021	10-191	See WADC-TR-53-477
49092	10-6652	See WADC-TR-173(Pt.1)
49140	10-6684	
49615	10-7699	See CAL-KB-836-M-8
49668	10-4654	See MAB-87-M
49812	10-4655	See NAA-AL-2064-1
50074	10-4795	See WADC-TR-54-519(Pt.II)
50078	10-790	See WADC-TR-54-38
50112	10-6646	
50234	10-7720	See RAE-TN-MET-201
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50451	10-6857	
50531	10-5550	
50566	10-764	See WADC-TR-54-66
51073	10-6685	
51570	10-5675	See WADC-TR-54-206
51791	10-2735	See WCRT-TN-54-51
51807	10-4992	See NRL-4484
52373	10-7710	See NOTS-TM-1628
52379	10-7697	See AML-NAM-AE-4108.6(Pt.V)
52664	10-11845	See WADC-TR-54-231(Pt. 1)
52850	10-5002	
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53633	10-7721	See RPL-3
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54006	10-6686	
54059	10-7618	
55199	10-5676	See WADC-TR-54-303
55229	10-4692	See NAVORD-3847
55284	10-6709	See PA-TR-2106
55832	10-4642	
56109	10-4991	See NM-001.059.18.03
56362	10-4643	
56665	10-6694	See EES-0400291
57142	10-4656	See NAA-AL-2064-6
57244	10-4604	See CAL-IG-842-M-13
58304	10-5606	
58412	10-7734	See WAL-893/154-16
58599	10-7725	See WADC-TR-53-162(pt.2)
58607	10-132	See WADC-TR-53-288(Pt.6)
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63502	10-1392	See WADC-TR-53-190(Pt.3)
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63962	10-1395	See WADC-TR-54-588
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66441	10-585	See WADC-TR-52-5(Suppl.3)
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66671	10-9327	See TAM-89
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66772	10-4585	See WADC-TR-55-87
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71554	10-4560	See WADC-TN-55-150
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71864	10-6622	See DGGW-EMR-55-6
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72124	10-9326	See RAE-TN-MET-218
72229	10-6567	See OSR-TN-55-312
72451	10-9126	See RAE-Trans-526
72452	10-6630	See RAE-Trans-527
72454	10-11166	See RAE-Trans-530
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73477	10-7001	
74332	10-5591	See AFCRC-TR-55-277
73667	10-10195	See SM-205
74305	10-10198	See WADC-TR-54-598
74762	10-7707	See NAA-AL-2151
74767	10-4595	See OSR-TN-55-340
74889	10-8515	See TIB/T-4419
74929	10-7820	See CM-850
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75854	10-5620	See WADC-TR-55-82
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75869	10-5500	See WADC-TR-55-16
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76872	10-4670	See WADC-TR-52-251(Pt.III)
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77339	10-5529	See RAE-Trans-543
77744	10-10275	See NAVORD-4086
77763	10-7050	
78040	10-4537	See TIB/T4495
78467	10-11808	See RIA-55-4161
79339	10-5733	
79802	10-11198	See RRE-TN-555
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81058	10-6707	See OSR-TN-56-66
81363	10-8403	See NAA-AL-2064-16
81522	10-5664	See OSR-TN-56-70
81534	10-7833	See OSR-TN-56-81
81608	10-6025	See OSR-TN-55-438
81707	10-10192	See NOTS-TM-1939
82011	10-7821	See OSR-TN-56-98
82015	10-6708	See OSR-TN-56-102
82016	10-5665	See OSR-TN-56-103
82434	10-7691	
82510	10-8468	See OSR-TN-56-114
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82514	10-7811	See OSR-TN-56-118
82829	10-8710	
83048	10-7832	See OSR-TN-55-383
83344	10-7692	
83592	10-7646	See RAE-TN-CHEM-1264
83639	10-8510	
83651	10-7784	See WAL-111/23
84466	10-6627	See OSR-TN-56-26
84555	10-10260	See WADC-TR-55-35
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84867	10-6641	
85210	10-7496	See CI/R-100
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86585	10-9416	See OSR-TN-56-164
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163	10-628	See CRE-374
219	10-339	Can. J. Phys. 33, 607-8(1955)
230	10-202	See CRCE-608
232	10-375	See DR-32
233	10-6490	See GPI-14
235	10-1769	Can. J. Chem. 33, 1775-9(1955)
236	10-1770	Can. J. Chem. 33, 1780-91(1955)
240	10-2882	$1.00
241	10-1411	See PR-P-27
242	10-504	
243	10-1949	Can. J. Phys. 33, 886-8(1955)
252	10-1551	See DL-20
254	10-505	$0.25
255	10-1852	Can. J. Phys. 33, 889-91(1955)
257	10-2898	Can. J. Phys. 34, 20-3(1956)
259	10-1923	$0.25
262	10-2870	Can. J. Phys. 34, 147(1956)
263	10-1977	See DL-21
265	10-2164	See DL-19
274	10-11956	Can. J. Chem. 34, 206-13(1956)
275	10-12048	Can. J. Chem. 34, 201-5(1956)
276	10-11943	Can. J. Chem. 34, 214-19(1956)
277	10-11773	Can. J. Chem. 34, 220-6(1956)
278	10-11986	Can. J. Chem. 34, 253-8(1956)
280	10-12125	Can. J. Chem. 34, 259-64(1956)
282	10-5899	See PR-P-28
285	10-5964	See DR-38
296	10-6851	See CRT-631
297	10-7607	Can. J. Chem. 34, 515-22(1956)
298	10-8207	$1.00(AECL)
299	10-7560	See CRCE-466
302	10-6456	
308	10-9242	Can. J. Chem. 34, 749-56(1956)
310	10-9233	See CRC-636
314	10-9234	See CRC-639
316	10-4698	See PR-P-29
319	10-4927	See DL-25
329	10-11406	See CRP-642-A
330	10-11456	Can. J. Phys. 34, 949-58(1956)
331	10-8533	See CRP-632
332	10-8591	See CRDC-637
337	10-11152	Can. J. Chem. 34, 1176-81(1956)
338	10-11457	Can. J. Phys. 34, 959-67(1956)
339	10-11984	See CRP-654
340	10-9399	See CRP-652
344	10-9250	See CRB-658
345	10-10522	See CRRP-657
346	10-11434	See CRRP-659
347	10-12023	See CRRP-656
348	10-11134	See CRDC-640
349	10-12027	See NPG-9(AECL)
350	10-11490	See CRRP-655
353	10-11133	See CRC-661
AEDC-TR		
55-11	10-11782	
AERE (British)		
9ER/3	10-12015	
AERE-C/M (British)		
1	10-7495	
82	10-10110	
96	10-9999	
115	10-11804	
222	10-10084	
250	10-10160	
260	10-2643	Dep.
262	10-8650	
265	10-6610	Dep.; $0.45
266	10-10029	Analyst 81, 367-9(1956)
272	10-7654	Dep.
273	10-5624	Dep.; $1.15
278	10-10494	Dep.; $0.75
280	10-9229	Dep.
1884	10-7462	$0.50
AERE-C/R (British)		
298(Rev.)	10-5577	See AERE-C/R-1804
345	10-7633	
392	10-11243	
498(Del.)	10-10018	
533	10-4531	Dep.
800	10-8279	
1224	10-11707	Dep.; $1.70
1501	10-10095	Analyst 81, 417-26(1956)
1502	10-2926	Dep.
1520	10-6588	Dep.
1575(1)	10-7534	Dep.; $3.00
1575(2)	10-7534	Dep.; $6.50
1575(3)	10-7534	Dep.; $1.80
1575(4)	10-11742	Dep.
1575(5)	10-10057	Dep.; $2.85
1575(6)	10-11118	Dep.; $1.70
1637	10-605	Analyst 81, 456-69(1956)
1646	10-248	$1.15
1649	10-11702	J. Chem. Soc., 2770-4(1956)
1651	10-6869	J. Sci. Instr. 33, 46-51(1956)
1699	10-458	J. Inorg. and Nuclear Chem. 1, 241-7(1955)
1686	10-10124	Dep.
1709	10-500	J. Inorg. and Nuclear Chem. 1, 248-52(1955)
1715	10-1547	$3.50
1725	10-1232	Dep.; $0.65
1735	10-1256	Dep.
1747	10-11940	J. Sci. Instr. 33, 359-60(1956)
1749	10-1233	$0.90

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AERE-C/R (British)		
1752	10-9175	J. Chem. Soc., 1186-92(1956)
1755	10-6553	Analyst 81, 110-13(1956)
1757	10-2650	
1759	10-9484	J. Sci. Instr. 33, 230-4(1956)
1777	10-11076	Anal. Chim. Acta 15, 129-40(1956)
1780	10-9168	Anal. Chim. Acta 14, 414-22(1956)
1799	10-8626	J. Inorg. and Nuclear Chem. 2, 205-8(1956)
1804	10-5577	
1805	10-9240	Dep.; $0.65
1809	10-8798	Dep.
1813	10-5521	Dep.; $0.90
1861	10-4579	Dep.
1862	10-4580	Nuclear Eng. 1, 119-22(1956)
1864	10-11723	Analyst 81, 506-12(1956)
1865	10-6545	Dep.; $0.45
1869	10-11724	Analyst 81, 512-17(1956)
1870	10-6589	Dep.; $0.50
1874	10-5578	
1883	10-11596	J. Inorg. and Nuclear Chem. 3, 9-14(1956)
1892	10-5734	Dep.
1927	10-8209	Dep.; $0.75
1951	10-11756	Dep.
AERE-CE/R (British)		
1730	10-1271	$1.00
1779	10-5792	
AERE-E/M (British)		
31	10-10495	
72	10-10496	
AERE-E/R (British)		
173	10-126	$0.90
388	10-10497	
514	10-10693	
663	10-10127	
AERE-ED/M (British)		
27	10-4587	Dep.
AERE-ED/R (British)		
1856	10-11171	Dep.
1590	10-10498	
1844	10-5615	$1.40
1856	10-11171	Dep.
AERE-EL/L (British)		
7	10-11342	
AERE-EL/M (British)		
42	10-5793	$0.75
92	10-946	$0.65

Report	Abstract	Availability
AERE-EL/R (British)		
1507	10-249	
1555	10-2197	Brit. J. Appl. Phys. 6, 444-9(1955)
1676	10-921	
1753	10-4779	Dep.
1851	10-5818	Dep.; $0.65
1997	10-9457	Dep.
AERE-G/M (British)		
13	10-5652	
38	10-7106	Dep.
AERE-GP/M (British)		
153	10-6546	
182	10-761	
187	10-5782	Dep.
190	10-4755	Dep.
AERE-GP/R (British)		
1613	10-1074	
1742	10-1582	Dep.
1748	10-2903	
1800	10-4756	Dep.
1839	10-4757	Dep.
1855	10-5777	Dep.; $1.15
1906	10-8318	Dep.
1994	10-9143	Dep.
AERE-HP/L (British)		
23	10-9966	Dep.; $3.15
AERE-HP/M (British)		
70	10-7864	
89	10-6543	
95	10-110	Atomics 6, 312-20(1955)
AERE-HP/R (British)		
1737	10-9075	Brit. J. Radiol. 29, 317-25(1956)
AERE-I/M (British)		
21	10-11244	
39	10-6590	Dep.
AERE-I/R (British)		
1369	10-143	J. Sci. Instr. 32, 394-8(1955)
1688	10-9389	Dep.
1693	10-6644	Dep.; $1.25
AERE-INF/Bib (British)		
93(3rd Ed.)	10-2699	Dep.
97	10-7376	Dep.
98	10-6840	Dep.
99	10-6979	Dep.
102	10-7695	Dep.
103	10-10181	Dep.; $0.35

Report	Abstract	Availability
AERE-Lib/Trans (British)		
443	10-205	
444	10-5004	
489	10-1432	
491	10-6052	
496	10-4701	
521	10-2009	Dep.
522	10-4733	
528	10-1244	Dep.
529	10-6571	Dep.
532	10-6596	Dep.
533	10-2771	
536	10-5756	
547	10-1433	Dep.
548	10-334	
549	10-5026	
555	10-2707	
557	10-230	
559	10-1978	
563	10-196	
564	10-1434	Dep.
567	10-2711	Dep.
568	10-6727	Dep.
569	10-335	
570	10-1521	Dep.
571	10-5912	Dep.
573	10-6761	Dep.
574	10-6536	Dep.
575	10-422	
576	10-8216	Dep.
577	10-6728	Dep.
578	10-7028	Dep.
579	10-1338	Dep.
580	10-8481	Dep.
582	10-1590	Dep.
584	10-4576	
585	10-2227	Dep.
586	10-11847	Dep.
587	10-2818	Dep.
588	10-2819	Dep.
589	10-9463	Dep.
590	10-6628	Dep.
591	10-2694	
592	10-5599	Dep.
593	10-5684	Dep.
595	10-6537	Dep.
596	10-4601	
597	10-8482	Dep.
598	10-8483	Dep.
599	10-276	
601	10-1152	
603	10-9392	Dep.
604	10-5528	
605	10-8291	Dep.
606	10-2692	Dep.
607	10-8188	Dep.

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AERE-Lib/Trans. (British)		
608	10-8189	Dep.
609	10-8190	Dep.
610	10-2908	Dep.
611	10-9124	Dep.
612	10-7003	Dep.
613	10-5862	
616	10-5811	Dep.
617	10-2049	Dep.
618	10-6831	Dep.
619	10-6729	Dep.
621	10-2772	Dep.
622	10-8191	Dep.
625	10-2943	Dep.
629	10-2802	Dep.
630	10-8496	Dep.
631	10-5685	Dep.
633	10-8217	Dep.
634	10-7085	Dep.
636	10-9497	Dep.
637	10-8564	Dep.
638	10-9343	
639	10-6762	
640	10-6538	Dep.
641	10-5621	Dep.
642	10-5686	Dep.
643	10-5687	Dep.
644	10-4713	Dep.
645	10-8319	Dep.
646	10-5981	Dep.
648	10-6063	Dep.
650	10-4562	
651	10-9636	Zhur. Eksptl.' i Teoret. Fiz. 29,274-9
652	10-7061	
653	10-5982	Dep.
654	10-8076	Zhur. Eksptl.' i Teoret. Fiz. 29, 292-5 (1955)
655	10-6064	Dep.
656	10-7876	
658	10-6799	
659	10-5600	Dep.
660	10-8681	Dep.
661	10-6763	Dep.
662	10-5545	
663	10-5744	Dep.
664	10-7477	Dep.
669	10-10674	
670	10-7836	
671	10-7738	
676	10-6730	Dep.
678	10-5745	Dep.
679	10-6539	Dep.
682	10-6629	Dep.
684	10-7478	
685	10-10006	Dep.

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AERE-Lib/Trans (British)		
686	10-6806	Dep.
687	10-6821	Dep.
688	10-11913	Dep.
690	10-7600	
691	10-7854	
692	10-6989	
696	10-6780	Dep.
697	10-5688	Dep.
698	10-5515	
699	10-6597	Dep.
700	10-5516	Dep.
701	10-5746	Dep.
702	10-6764	Dep.
703	10-7739	Dep.
704	10-7787	
705	10-7660	
706	10-7661	
708	10-10207	Dep.
710	10-8348	
711	10-7740	
714	10-7741	Dep.
716	10-8192	Dep.
717	10-7669	
718	10-7004	Dep.
719	10-8529	Dep.
720	10-7742	
723	10-6575	Dep.
725	10-8292	
730	10-7743	Dep.
731	10-8024	
734	10-7506	Dep.
736	10-7592	
737	10-7384	
738	10-10227	Dep.
739	10-10228	Dep.
740	10-10229	Dep.
742	10-6551	Dep.
743	10-6552	Dep.
745	10-8193	Dep.
748	10-7385	
757	10-10167	Dep.
759	10-11914	Dep.
767	10-11696	Dep.
776	10-7670	Dep.
1484	10-1156	
AERE-M/M (British)		
99	10-830	
104	10-4612	J. Inst. Metals 84, 453-4(1956); Dep.
108	10-4622	
119	10-7999	Dep.

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AERE-M/R (British)		
649	10-776	
1543	10-8368	J. Nuclear Energy 2, 202-12(1956)
1588	10-5731	J. Inst. Metals 84, 112-14(1956)
1603	10-5726	J. Inst. Metals 84, 10-18(1955)
1626	10-10225	J. Nuclear Energy 2, 291-8(1956)
1723	10-11852	Acta Met. 4, 460-8(1956)
1846	10-5735	Dep.
1854	10-9181	Dep.
1889	10-5958	
1898	10-8457	Dep.
1944	10-10693	Dep.
1950	10-10499	Dep.
1974	10-10182	Dep.
1985	10-11212	Nuclear Power 1, 155-61(1956); Dep.
AERE-M/TN (British)		
35	10-6657	
AERE-N/M (British)		
70	10-10593	
76	10-7865	
AERE-N/R (British)		
134	10-4912	Dep.
814	10-10111	
1109	10-10112	
AERE-NP/L (British)		
1	10-4854	
AERE-NP/R (British)		
1611(Rev.)	10-10058	See AERE-NP/R-1982
1720	10-250	$0.90
1770	10-8531	Dep.
1894	10-7952	
1982	10-10058	Dep.
AERE-NURG/M (British)		
38	10-11462	
54	10-11463	
AERE-R/M (British)		
3	10-10500	
6	10-10501	
8	10-11405	
18	10-7977	
22	10-10637	
AERE-R/R (British)		
1225	10-8651	$0.90
1940	10-11464	
1963	10-8050	Dep.; $0.75

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AERE-R/R (British)		
1980	10-7978	Dep.
AERE-RE/R (British)		
1492	10-10312	
AERE-RP/M (British)		
38	10-10643	
45	10-4913	
65	10-6980	Dep.
67	10-8698	Dep.
72	10-5890	$0.50
79	10-6926	Dep.; $0.35(OTS)
81	10-10502	Dep.
AERE-RP/R (British)		
1389(Del.)	10-5029	J. Nuclear Energy 2, 128-40(1955)
1433(Del.)	10-8648	J. Nuclear Energy 2, 177-86(1956)
1447	10-1064	J. Nuclear Energy 2, 52-8(1955)
1549	10-10389	J. Nuclear Energy 2, 286-90(1956)
1627	10-10576	J. Nuclear Energy 2, 247-54(1956)
1713	10-4914	Dep.
1776	10-8652	Dep.
1778	10-4915	Dep.
1942	10-6927	
AERE-RS-L (British)		
3	10-2187	$0.75
AERE-SPAR (British)		
1	10-5473	
2	10-9032	Dep.
3	10-5474	
4	10-5522	Dep.
6	10-4516	
7	10-6515	Dep.
15	10-4503	Dep.
AERE-T/M (British)		
5	10-11465	
16	10-11400	
46	10-11466	
48	10-10503	
53	10-10387	
59	10-10504	
63	10-11151	
65	10-10505	
81	10-10506	
85	10-10507	
87	10-10508	
128	10-1075	Dep.
131	10-5959	Dep.
135	10-7095	
136	10-7621	Dep.

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AERE T/M (British)		
137	10-11467	Dep.
139	10-10594	Dep.
AERE-T/R (British)		
287	10-10388	
528	10-8653	
920	10-10509	
1337	10-10510	
1367	10-947	
1617(Del.)	10-1086	
1718	10-2051	Proc. Roy. Soc. (London) A233, 367-76 (1955) (Condensed)
1791	10-4965	Dep.
1792	10-4739	Dep.
1903	10-8654	Dep.
1904	10-5960	Dep.
AERE-X/R (British)		
1771	10-1583	Dep.
1806	10-7696	
1904	10-5960	
AF-SAM		
55-25	10-5442	
55-41	10-5447	
55-45	10-1717	
55-61	10-6489	
55-65	10-7387	
55-94	10-1173	Arch. Opthalmol. 54, 863-74(1955)
55-114	10-7388	
55-119	10-7422	Radiation Research 4, 321-5(1956)
55-139	10-7389	
56-15	10-11343	
56-18	10-11606	
AF-TR		
6517(Pt.3)	10-6689	
6519(Pt.IV)	10-1347	
6731(Pt.4)	10-8399	
AFCRC-TN		
56-200	10-11880	
56-235	10-9415	
AFCRC-TR		
55-277	10-5591	
AFSWC-TR		
55-27	10-7933	See TOI-55-25
AFSWP		
778	10-6469	See USNRDL-TR-84

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AFSWP		
798	10-1097	See USNRDL-453
799	10-11693	See USNRDL-TR-102
905	10-1846	See USNRDL-TR-61
AGC		
1229-5	10-54	
1229-6	10-2670	
AMD		
197	10-4754	See AECU-3149
AML-NAM-AE (Non-AEC)		
4108.6(Pt.V)	10-7697	
AMRL		
173	10-7436	Radiology 67, 419-21(1956)
177	10-7380	
206	10-41	
219	10-6505	
229	10-4504	
237	10-6858	
251	10-11008	
ARC (British)		
1327	10-6646	See AD-50112
1951	10-785	See AD-59979
ARDE(M) (British)		
2/55	10-5607	
ARE-H (British)		
7/53	10-5819	
ARL/R (British)		
3/E600	10-1838	
ATC		
54-12	10-1150	
ATI		
204861	10-11178	
52341	10-174	
63671	10-145	See BIOS-FR-896
111187	10-6925	
144081	10-10149	See HE-150-84
156652	10-584	See WADC-TR-52-5 and WADC-TR-52-5
158806	10-6650	See WADC-TR-52-111
174445	10-6651	See WADC-TR-52-155
203413	10-1366	
AWRE-H (British)		
15/53	10-4613	
AWRE-O (British)		
4/54	10-5616	
6/55	10-4758	
7/53	10-8210	
11/53	10-5736	
12/55	10-1754	
14/55	10-1234	
18/55	10-5891	
20/55	10-1462	
29/54	10-5794	
33/55	10-4780	
42/55	10-6614	
43/54	10-5475	
61/54	10-5443	
BAC		
02-978-010	10-127	
BIOS-FR (British)		
896	10-145	
BM		
3289	10-563	
BM-IC		
7725	10-1616	
BM-RI (Non-Project)		
5141	10-175	
5168	10-607	
5170	10-1808	
5175	10-4647	
5178	10-5653	
5182	10-5737	
5189	10-5625	
5201	10-8369	Bureau of Mines
5204	10-7664	
5213	10-3921	Bureau of Mines
5247	10-8400	
5248	10-8401	
5250	10-8402	
5253	10-9116	
5256	10-11708	
5265	10-10183	
BMI		
1056	10-2072	
BRL		
855	10-5813	
949	10-8511	
971	10-5795	
BRL-MR		
908	10-7819	

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BWR (British)		
5	10-1031	
CAL-IG		
842-M-13	10-4604	
CAL-KA		
797-M-10	10-835	
797-M-11	10-4648	
CAL-KB		
868-M-5	10-4649	
836-M-8	10-7699	
914-M-1	10-4650	
914-M-5	10-6693	
CCC		
1024-TR-107	10-232	
1024-TR-136	10-56	
1024-TR-139	10-57	
1024-TR-140	10-58	
1024-TR-141	10-59	
1024-TR-142	10-118	
1024-TR-143	10-60	
1024-TR-147	10-564	
1024-TR-148	10-565	
1024-TR-150	10-1210	
1024-TR-152	10-1211	
1024-TR-157	10-1212	
1024-TR-162	10-2611	
1024-TR-163	10-2612	
1024-TR-175	10-6547	
1024-TR-177	10-6518	
1024-TR-179	10-7463	
1024-TR-186	10-4532	
1024-TR-191	10-6519	
1024-TR-195	10-10128	
1024-TR-196	10-10384	
1024-TR-197	10-10056	
1024-TR-199	10-11686	
1024-TR-200	10-11687	
1024-TR-202	10-11688	
CCL		
6.1	10-5608	
CEA (French)		
305	10-9455	
327	10-4628	
329	10-9458	
336	10-5820	
350	10-4959	
363	10-8328	
370	10-4781	
374	10-4533	
CEA (French)		
378	10-8532	
380	10-4629	
390	10-9211	
481	10-4921	
482	10-4782	
483	10-4783	
508	10-4505	
571	10-9599	
CEI (Canadian)		
69	10-4554	
73	10-8232	
CERN (European)		
55-18	10-201	
55-23	10-411	Nuovo cimento (10) 2, Suppl. 1, 375-91 (1955)
55-24	10-412	Nuovo cimento (10) 2, Suppl. 1, 392-402 (1955)
55-27	10-1541	Kol. Danske Videnskab. Selskab, Mat.-Fys Medd. 29, No. 19, 1955.
55-28	10-1515	Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 1, 1955. 24p.
55-30	10-1514	Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 29, No. 16, 1955. 69p.
56-1	10-7012	
56-3	10-366	Phys. Rev. 100, 432-3(1955)
56-4	10-5010	Nuovo cimento (10) 2, Suppl. No. 4, 941-68(1955)
56-6	10-6065	Nuclear Phys. 1, No. 3, 164-79(1956)
56-8	10-7013	
56-20	10-10595	
CERN-PS/A-SCH (European)		
2	10-2179	
CERN-PS/AED (European)		
4	10-5998	
CERN-PS/ER (European)		
42	10-407	
43	10-1935	
CERN-PS/FG (European)		
2	10-408	
CERN-PS/LRF (European)		
1	10-233	
CERN-PS/MM (European)		
20	10-409	
21	10-1076	
22	10-1077	
23	10-8012	

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CERN-PS/PL (European)		
5	10-1078	
CERN-PS/RGB (European)		
8	10-922	
CERN-PS/RH (European)		
9	10-1458	
CI/R (British)		
9	10-11709	
92	10-8052	
100	10-7496	
CIT-ORD		
6D-TR27	10-5814	
CM		
850	10-7820	
CRB		
658	10-9250	Dep.; $0.50(AECL)
CRC (Canadian)		
628	10-5907	
633	10-5908	
636	10-9233	Dep.; $0.50(AECL)
639	10-9234	Dep.; $0.50(AECL)
661	10-11133	Dep.; $1.00(AECL)
CRCE (Canadian)		
466	10-7560	Dep.; $1.00(AECL)
608	10-202	
CRDC (Canadian)		
637	10-8591	Dep.; $0.50(AECL)
640		Dep.; $0.50(AECL)
CRE (Canadian)		
374	10-628	
CREL		
651	10-10286	
CRLR		
502	10-9647	
561	10-7866	
607	10-7867	
CRP (Canadian)		
632	10-8533	Dep.; $1.50(AECL)
CRP (Canadian)		
642-A	10-11406	Dep.; $5.00(AECL)
652	10-9399	Dep.; $1.00(AECL)
654	10-11984	Dep.; $2.00(AECL)
CRRP (Canadian)		
606	10-8657	
624	10-5962	
626	10-2885	
629	10-5963	
634	10-8658	Dep.; $1.50(AECL)
655	10-11490	Dep.; $1.50(AECL)
656	10-12023	Dep.; $0.50(AECL)
657	10-10522	
659	10-11434	Dep.; $0.50(AECL)
CRT (Canadian)		
631	10-6851	Dep.; $0.50(AECL)
CU (Misc.)		
1-56-SC-64630-Phys.	10-6924	See NP-5899
2-55-ORD-1420-Met.	10-867	See WAL-401/149-20
2-56-SC-64630 Phys.	10-7831	See NP-5926
3-56-SC-64630-Phys.	10-8514	See NP-6058
4-56-SC-64630-Phys.	10-8735	See NP-6057
5-56-ORD-1061-IE	10-6641	See AD-84867
6-56-ORD-1061-IE	10-4694	See NP-5977
13-55-SC-42519	10-5740	See NP-5879
20-56-AF-677-EE	10-8526	See OSR-TN-56-175
95-55-ONR-110-1-Phys.	10-6915	See NEVIS-15
97-56-ONR-1-Phys.	10-3032	See NEVIS-16
106-56-ONR-110-10-Phys.	10-6893	See NEVIS-23
CVAC		
264R	10-4542	
CWLR		
2031	10-5499	
2046	10-10382	
2051	10-10016	
2052	10-10017	
2053	10-9987	
DF		
55A0400	10-4759	

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DGGW-EMR (British)		
55-6	10-6622	
DL (Canadian)		
19	10-2164	Dep.; $1.00
20	10-1551	Dep.; $0.25
21	10-1977	Dep.; $0.50
25	10-4927	Dep.; $1.50
DM		
38	10-9600	
DR		
32	10-375	
38	10-5964	Dep.; $1.00
DRCL (Canadian)		
206	10-11943	See AECL-276
207	10-11773	See AECL-277
208	10-11956	See AECL-274
DTMB (British)		
510	10-4691	
DTMB-Trans		
109	10-7822	
110	10-11786	
EDI		
19	10-11581	
EDR		
841	10-10134	
EES		
030067	10-4591	
040029F	10-10185	
040029I	10-6694	
040038E	10-7700	
060088E	10-5610	
060088F	10-9312	
4C(8)17X1603	10-1809	
5NX1609	10-4592	
EMRL		
2	10-9313	
3	10-9314	
4	10-6695	
ER		
6671	10-7701	
ER		
7364	10-9315	
8018	10-10667	
8098	10-7981	
ERDE (British)		
23/R/55	10-10040	
ERI		
1943-7-51-P	10-1162	See COO-210
1966-1-P	10-2613	
2076-6-P	10-4651	
2110-4-p	10-7702	
2189-1-T	10-484	See OSR-TN-55-184
ETF		
107-94-15/7a	10-6563	See AD-75099
F		
2337-3	10-5663	See OSR-TN-55-404
FPSD/P (British)		
11	10-4579	See AERE-C/R-1861
12	10-4580	See AERE-C/R-1862
15	10-10124	See AERE-C/R/1686
FRDC/P		
33	10-11834	
FSE		
9-007	10-2895	See NARF-55-83T
FZK		
9-096	10-6492	See NARF-56-4T
FZR		
9-055(Rev. 1)	10-4542	See CVAC-264R
G		
17-55	10-1366	See ATI-203413
17-65	10-6684	See AD-49140
GEAP		
0500	10-2717	

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GER		
7491	10-10523	
7648	10-11491	
GPI (Canadian)		
14	10-6490	Dep.; $1.00
HADC-TR (Non-AEC)		
55-2	10-4480	
HARD(C)P/(British)		
2	10-10160	See AERE-C/M-250
HARD/P (British)		
7	10-8650	See AERE-C/M-262
HE		
150-84	10-10149	
150-101	10-10287	
150-127	10-7828	
HEPL (Misc.)		
40	10-6004	
100	10-9495	
I (Non-AEC)		
A1878-1	10-5664	See OSR-TN-56-70
IGC-ARDC/P (British)		
177	10-8330	See IGO-R/S-17
IGC-CPDC/R (British)		
122	10-4760	See IGR-TN/CA-251
IGC-CTC/R (British)		
156	10-7777	See IGR-R/CA-159
IGC-DDC/P (British)		
185	10-7777	See IGR-R/CA-159
IGC-EMC/P (British)		
52	10-8362	See IGE-R-13
IGC-NPCC-FEWP/P (British)		
42	10-4593	See IGR-TN/W-306
IGC-SWP/P (British)		
29	10-8362	See IGE-R-13
IGC-TRDC/P (British)		
129	10-4788	See IGR-TN/W 264
IGC-XMPDC/P (British)		
12	10-1371	See IGR-TN/C-250
IGC-XMWP/P (British)		
5	10-1371	See IGR-TN/C-250
IGE-R (British)		
11	10-8661	
13	10-8362	
IGO-AM/S (British)		
10	10-5523	
16	10-5524	
43	10-10020	
IGO-AM/W (British)		
34	10-4785	
35	10-4786	
36	10-4517	
37	10-4787	
38	10-7868	
39	10-8715	
56	10-10314	
57	10-10315	
IGO-R/S (British)		
17	10-8330	
IGR-R/CA (British)		
159	10-7777	
164	10-4772	
173	10-7829	
IGR-R/R (British)		
151	10-1055	
169	10-4929	
IGR-TN/C (British)		
250	10-1371	
276	10-5507	
IGR-TN/CA (British)		
251	10-4760	

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IGR-TN/W (British)		
264	10-4788	
306	10-4593	
IGRL-IB/R (British)		
6	10-7377	
IGRL-T/C		
14	10-9125	
IGRL-T/R (British)		
4	10-5601	
5	10-5602	
6	10-7616	
IGRL-T/W (British)		
8	10-4535	
J		
102-1	10-11581	See EDI-19
JENER (Norwegian)		
37	10-2167	
38	10-1319	
39	10-4789	
40	10-6574	
41	10-5809	
42	10-7984	
43	10-9601	
JENER-Pub (Norwegian)		
11	10-11757	
JPL-PR		
20-207	10-10187	
20-219	10-572	
LEO/A (British)		
63	10-7624	
LEO/N (British)		
43	10-7986	
LMFP/P (British)		
3	10-7999	See AERE-M/M-119
MAB		
87-M	10-4654	
101-M	10-177	
104-M	10-5508	
106-M	10-7705	
MCC		
1023-TR-150	10-6522	
1023-TR-152	10-7464	
1023-TR-162	10-573	
1023-TR-164	10-574	
1023-TR-165	10-7598	
1023-TR-169	10-1721	
1023-TR-170	10-1722	
1023-TR-174	10-1723	
1023-TR-177	10-1724	
1023-TR-178	10-1725	
1023-TR-183	10-10000	
1023-TR-186	10-5509	
1023-TR-187	10-5510	
1023-TR-191	10-5511	
1023-TR-193	10-7465	
1023-TR-194	10-7466	
1023-TR-203	10-8171	
1023-TR-206	10-9118	
1023-TR-207	10-9119	
1023-TR-208	10-11710	
1023-TR-213	10-11146	
1023-TR-217	10-11057	
MD (Canadian)		
169	10-8172	
172	10-8173	
195	10-7706	
196	10-7706	
201	10-8174	
2890	10-8175	
3010	10-8176	
3069	10-8177	
MD-TR (Canadian)		
560-CC	10-8178	
563-CC	10-8179	
ME		
208	10-6623	
ME-TR-ORD		
1121-2	10-5611	
Memo-CWT		
8	10-6021	J. Appl. Phys. 27, 207-9(1956)

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ML		
274	10-1079	
MLCR		
30	10-8162	
MLM		
1064	10-7457	Radiation Research 4, 294-302(1956)
MLM-CF		
55-8-22	10-8266	
MLSR		
30	10-547	
MR		
606	10-9317	
MR-N		
30	10-1464	See NARF-55-77T
96	10-950	See NARF-55-45T
100	10-951	See NARF-55-67T
101	10-1101	See NARF-55-68T
104	10-1858	See NARF-55-72T
106	10-12115	See NARF-55-85T
109	10-5823	See NARF-55-88T
112	10-7080	See NARF-55-96T
115	10-10527	See NARF-56-5T
119	10-10289	See NARF-56-7T
122-1	10-12084	
MSWP-N (British)		
18	10-6657	See AERE-M/TN-35
MURA-ESA		
4	10-7014	
MURA-FTC		
3	10-5999	
MURA-HRC		
1	10-8016	
MURA-KRS/AMS		
1	10-7015	
MURA-LHJ/ss		
1	10-6000	
MURA-LJL		
8(Rev.)	10-8017	
MURA-LWJ		
11	10-7017	
MURA-NVN		
3	10-6853	
4	10-8695	
MURA-TO		
5	10-6001	
NAA-AL		
2064-1	10-4655	
2064-6	10-4656	
2151	10-7707	
2064-16	10-8403	
NACA		
1210	10-5594	
NACA-RM		
E51G12	10-234	
56B07	10-9318	
NACA-RM-E		
52D07	10-6616	
54B15	10-4615	
54F10	10-5655	
55L14a	10-6624	
NACA-TM		
737	10-9393	
1147	10-767	
1184	10-5805	
1377	10-133	
1384	10-873	
1392	10-7614	
1395	10-9344	
1400	10-4596	
1403	10-7861	
1419	10-10188	
NACA-TN		
865	10-2075	
3271	10-6819	
3273	10-8458	
3309	10-4616	
3315	10-4657	
3495	10-778	

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NACA-TN		
3552	10-2721	
3556	10-2076	
3558	10-5789	
3584	10-5595	
3595	10-5656	
3596	10-4658	
3600	10-2722	
3660	10-8405	
3657	10-5738	
3669	10-7625	
3678	10-7708	
3681	10-4659	
3685	10-4660	
3727	10-8406	
3728	10-8407	
3731	10-7709	
3752	10-9319	
3755	10-10189	
3816	10-11836	
NARF		
53-34T(Rev.A)	10-6030	
55-45T	10-950	
55-67T	10-951	
55-68T	10-1101	
55-72T	10-1858	
55-77T	10-1464	
55-83T	10-2895	
55-85T	10-12115	
55-88T	10-5823	
55-96T	10-7080	
56-4T	10-6492	
56-5T	10-10527	
56-7T	10-10289	
56-271	10-12084	
NAVORD		
1965	10-10001	
2038	10-11837	
2048	10-11041	
3649	10-11169	
3847	10-4692	
4086	10-10275	
4557	10-8460	See NOLC-290
4563	10-5612	See NOLC-310
4567	10-7830	See NOLC-318
4572	10-8180	See NOLC-324
NBTL-T-R		
89	10-842	
NCSC		
108	10-1557	
109	10-2814	
124	10-2896	

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NDA		
14	10-332	
14-24	10-1496	
14-34	10-1558	
14-46	10-1559	
14-58	10-1560	
14-71	10-1497	
14-84	10-1561	
NEI (Canadian)		
51	10-2897	
NEPA-IC (Non-Project)		
51-3-21	10-4617	
NEVIS		
14	10-4835	Phys. Rev. 101, 412-18(1956)
15	10-6915	Phys. Rev. 101, 1536-47(1956)
23	10-6893	Phys. Rev. 102, 1676-84(1956)
NM		
000-019.02.01	10-7859	
001-059.13.07	10-7796	
001-059.18.03	10-4991	
006-012.04.74	10-1164	
006-012.04.80	10-4506	
006-012.04.81	10-514	Cancer 9, 768-72(1956)
006-012.04.82	10-16	
006.012.04.91	10-5476	
006.012.04.92	10-7870	
006-012.04.93	10-6504	
006.012.04.99	10-9036	
006.012.05.12	10-1165	
006.012.05.15	10-5484	
006-012.05.16	10-4507	
NML		
5115-B-19.15 (Pt.4)	10-6860	
NOL-CORONA		
143	10-2751	
151	10-2788	
252	10-2752	
NOLC		
268	10-8459	
290	10-8460	
310	10-5612	

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NOLC		
318	10-7830	
324	10-8180	
NOTS		
535	10-10001	See NAVORD-1965
713	10-11837	See NAVORD-2038
740	10-11041	See NAVORD-2048
NOTS-TM		
1628	10-7710	
1939	10-10192	
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4859(Suppl. 7)	10-2093	
4859(Suppl. 8)	10-10226	
4963(Suppl.)	10-953	
5056(Del.)	10-2626	
5057(Del.)	10-2626	
5686	10-1059	
5778	10-203	
5779	10-120	
5780	10-64	
5781	10-178	
5783	10-179	
5786	10-251	
5789	10-180	
5790	10-181	
5791	10-221	
5792	10-17	PB 111636S, $11.00(OTS)
5793	10-18	PB 111637S, $4.25(OTS)
5794	10-575	
5795	10-795	
5796	10-786	
5797	10-762	
5798	10-843	
5799	10-737	
5801	10-954	
5802	10-844	
5803	10-1116	
5804	10-889	
5805	10-1117	Phys. Rev. 102, 1423-47(1956)
5806	10-890	
5807	10-738	
5809	10-635	
5810	10-845	
5811	10-576	
5812	10-846	
5813	10-847	
5815	10-536	
5816	10-923	
5818	10-783	
5819	10-1373	
5820	10-848	
5822	10-1166	
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5824	10-1507	

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5825	10-1374	
5826	10-1375	
5827	10-1376	
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5829	10-1378	
5830	10-1333	
5832	10-1214	
5833	10-1455	
5834	10-1379	
5835	10-1380	
5836	10-1381	
5837	10-1811	
5838	10-1812	
5840	10-1775	
5841	10-1813	
5842	10-1727	
5843	10-1896	
5844	10-2109	
5846	10-1840	
5849	10-2172	
5850	10-2078	
5851	10-2079	
5852	10-2704	
5854	10-11961	
5855	10-11962	
5856	10-2019	
5857	10-2055	
5858	10-2080	
5859	10-2757	
5860	10-2758	
5861	10-2616	
5862	10-4594	
5864	10-2723	
5865	10-5003	
5866	10-2724	
5867	10-2789	
5868	10-4847	
5869	10-4848	
5870	10-5613	
5871	10-5657	
5872	10-5596	
5873	10-5439	
5874	10-5658	
5875	10-5739	
5876	10-5898	
5877	10-5448	
5878	10-5597	
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5881	10-5659	
5882	10-5660	
5883	10-5859	
5884	10-5614	
5885	10-5551	
5886	10-5583	
5887	10-6031	
5887(Add.)	10-9602	
5888	10-5661	
5889	10-6005	
5890	10-5886	
5892	10-6523	
5893	10-6697	
5895	10-6524	

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5896	10-6525	
5897	10-6698	
5898	10-6526	
5899	10-6924	Phys. Rev. 102, 1308-21(1956)
5900	10-6861	
5901	10-6527	
5903	10-6699	
5904	10-6750	
5905(Pt.1)	10-6625	
5906	10-7499	
5907	10-7390	
5908	10-7711	
5909	10-7615	
5911	10-7712	
5912	10-7639	
5913	10-7937	
5914	10-7938	Phys. Rev. 102, 1613-20(1956)
5915	10-8057	
5916	10-7713	
5917	10-8058	
5918	10-8313	
5919	10-7714	
5921	10-7779	
5922	10-7666	
5923	10-7939	Phys. Rev. 102, 1545-53(1956)
5924	10-7871	
5925	10-7940	
5926	10-7831	
5927	10-7780	
5928	10-7781	
5929	10-7940 10-8267	Phys. Rev. 103, 469-80(1956)
5930	10-8310	
5931	10-8268	
5932	10-8269	
5933	10-8270	
5934	10-8271	
5935	10-8350	
5936	10-7656	
5937	10-7667	$5.75 (GPO)
5938	10-7860	
5939	10-8033	
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5942	10-8237	
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5994	10-6828	
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6004	10-5586	
6006	10-6457	
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6012	10-6752	
6014	10-6531	
6016	10-6462	
6017	10-7391	
6017(p.1-31)	10-7392	
6017(p.32-44)	10-7393	
6017(p.45-70)	10-7928	
6017(p.71-84)	10-7460	
6017(p.85-98)	10-7394	
6017(p.99-108)	10-7428	
6018	10-6626	
6020(Vols. I and II)	10-6700	
6022	10-6564	
6023	10-7018	
6024	10-6647	
6025	10-6648	
6026	10-8059	
6029	10-7645	
6030	10-7566	
6031	10-6701	
6032	10-8465	
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6035	10-7468	
6037	10-7988	
6038	10-7395	Radiation Research 5, 167-88(1956)

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6039	10-8538	
6041	10-8408	
6042	10-8466	
6043	10-8524	
6044	10-8372	
6045	10-8351	
6046	10-7846	
6047	10-8332	
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6049	10-8409	
6050	10-8357	
6051	10-8373	
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6057	10-8735	
6058	10-8514	
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6061	10-8747	
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6063	10-10597	Dep.
6064	10-9122	
6065	10-9262	
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6071	10-9255	
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6089	10-11126	
6090	10-11097	
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6097	10-11755	
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6100	10-11[illegible]	
6105	10-11884	
6108	10-12120	
NPG (Canadian)		
9(AECL)	10-12027	Dep.; $1.00(AECL)
126	10-1151	Dep.; $0.45(OTS)
NRC (Canadian)		
3767	10-1847	Can. J. Phys. 33, 746-56(1955)
3805	10-2759	Can. J. Phys. 34, 1-19(1956)
3933	10-8493	Can. J. Phys. 34, 432-50(1956)
4036	10-11094	Can. J. Chem. 34, 1288-1301(1956)
4044	10-11267	Can. J. Phys. 34, 968-84(1956)
NRDC (British)		
81	10-8613	$1.00
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4429	10-5552	
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NEW NUCLEAR DATA

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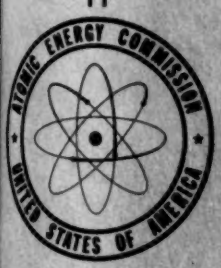

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NEW NUCLEAR DATA

Compiled by the Nuclear Data Group, National Research Council
Washington 25, D. C.

C. L. McGinnis, editor;
G. H. Fuller, D. N. Kundu, K. Way, and M. Yamada

READERS

F. Ajzenberg-Selove, Boston University, Boston, Massachusetts.
G. A. Bartholomew, Atomic Energy of Canada, Limited, Chalk River, Ontario, Canada.
B. Crasemann, Oregon University, Eugene, Oregon.
H. Daniel and Th. Mayer-Kuckuk, Institut für Physik im Max-Planck-Institut für medizinische Forschung, Heidelberg, Germany.
R. W. Fink, University of Arkansas, Fayetteville, Arkansas.
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J. W. Mihelich, University of Notre Dame, Notre Dame, Indiana.
H. Pomerance, Oak Ridge National Laboratory, Oak Ridge, Tennessee.
N. Ryde, Chalmers Tekniska Hogskola, Göteborg, Sweden.
J. R. Stehn, Knolls Atomic Power Laboratory, Schenectady, New York.
R. van Lieshout, Instituut voor Kernphysisch Onderzoek, Amsterdam, Netherlands.

Table 1. Radioactivity, Levels, Abundances, Moments
Table 2. Neutron Cross Sections
Table 3. Ground State Q's
Table 4. Mass Differences
Table 5. Nuclear Spins and Moments

INTRODUCTION

This issue of Nuclear Science Abstracts, Volume 10, No. 24B, contains the fifth annual cumulation of new nuclear data. The results collected here have been taken from journals which have become available from about October 1955 to October 1956. As the list of the specific journals abstracted, which is given below shows, the coverage in this cumulation begins where it left off for the 1955 list.

Earlier 1956 nuclear data summaries have been published in Nuclear Science Abstracts, Volume 10, No. 12B (June 30, semiannual cumulation) and No. 18B (September 30). These summaries, together with the material which came to hand since 18B was prepared, are included in the present one.

The 1952, 1953, 1954, and 1955 annual cumulations are contained in issues 24B of Vols. 6, 7, 8, and 9 respectively. The supply of extra copies for 1952, 1953, and 1954 is exhausted; for 1955 copies are obtainable for $0.60 from the Superintendent of Documents, U. S. Government Print-

ing Office, Washington 25, D. C. Remittance should be by check or money order. Add 25% for foreign postage.

New Table of Data on Nuclear Spins and Moments: The present cumulation contains for the first time a separate list, Table 5, of the new data on nuclear spins, magnetic, and electric moments. Although these data are also to be found in Table 1, they have been made into a separate collection for the benefit of those particularly interested in the field of moments. The Neutron Cross Sections and the Mass Differences which are given in Tables 2 and 4 are not included in Table 1, since this table is devoted chiefly to information on the properties of nuclear levels. Ground State Q's are given in Table 1 when they are reported in a paper dealing with level properties. However, for complete information on new measurements of ground state Q's, the reader should consult Table 3.

Nuclear Data Cards: As the current literature is surveyed, the new nuclear results are first printed on 3-by-5-inch cards which are collected into sets of about 150 cards each month. Individuals, laboratories, or libraries may subscribe to the card sets directly by applying to the Publications Office, National Research Council, 2101 Constitution Avenue, N.W., Washington 25, D. C.

Due to the response to this service it has been possible to reduce the subscription charges to the following: U. S. and Canada $15 (1st class postage), formerly $20; elsewhere $15 (printed matter postage) or $19 (1st class postage), formerly $30 airmail. Airmail rates on request.

Nuclear Level Schemes: The first section of a new comprehensive nuclear data table prepared by the Nuclear Data Group was published late in 1955 by the Government Printing Office. The aim of Nuclear Level Schemes is to provide a revision and expansion of Nuclear Data which was issued in 1950 as Circular 499 of the U. S. National Bureau of Standards. It will be published in five or six sections, each one of which will be issued upon completion. The first section, now available gives the data for known nuclei with mass numbers between A = 40 and A = 92, thus covering roughly the elements $_{20}$Ca through $_{40}$Zr. The second section will summarize the information for the next 20 elements, the third for 20 more, and so on.

The style of presenting data in Nuclear Level Schemes is very similar to that used on the Nuclear Data Cards and in the cumulated lists of Nuclear Science Abstracts. The cards, or the lists, will thus provide a convenient means of keeping this table up to date.

Nuclear Level Schemes (A = 40 to A = 92), TID-5300, can be ordered from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. Price $1.75, 240 pages paperbound. Remittance should be by check or money order. Add 25% for foreign postage.

NUCLEAR DATA STATISTICS

Just below some numbers are given to show the amount of new nuclear data in 1956 compared to that in previous years. The periods referred to as 1955, 1956 etc. are twelve month periods beginning each year at about Oct. 1st. By an "item" is meant the information on a particular nucleus given with its reference in the main section, Table 1, of the cumulation which covers Radioactivity, Levels, Abundances, Moments.

	Number of Items on Radioactivity etc.	Number of Cross Sections	Number of Ground State Q's	Number of Mass Differences	Number of Nuclear Moments	Number of New Nuclei Reported	Total NSA Pages
1952*	1186	264	205	139	99		52
1953	1026	562	140	133	60		74
1954	1328	308	107	112	79		99
1955	1581	425	107	18	84	67	141
1956	1534	433	133	106	75	39	144

*15 months.

SOME 1956 HIGHLIGHTS

Expressions of interest in our list of 1955 "Highlights" have prompted us to make a similar collection for 1956. We realize, of course, choices for any such list depend in a highly personal way on the particular interests and enthusiasms of the authors. It is in the spirit of trying to make the following large collection of data more interesting rather than of awarding special praise that these comments are made. In many cases it seemed cumbersome to repeat here the names of the authors of all the experimental work cited. These names together with complete literature references are given in the data tables under the relevant nuclei. References to theoretical papers mentioned are given at the end of the "Highlights."

Although the neutrino does not really belong to the nuclear family, data on its properties have consistently been noted in these cumulations because of its importance in the fundamental concepts of β decay. Its existence was finally definitely established during the year as the result of a series of unusually difficult and large scale experiments carried out by Cowan and Reines which demonstrated the existence of the reaction $H^1(\nu,e^+)n$. The observation of 2.88 ± 0.22 counts per hour due to delayed coincidences between annihilation γ's and the γ rays from neutron capture made it possible to determine the reaction cross section as $\sim 10^{-19}$ barns for fission product neutrinos. Another experiment also completed this year showed that the cross section for the reaction Cl^{37} $(\nu,e^-)A^{37}$ for fission product neutrinos is $< 0.9 \times 10^{-21}$ barns. This latter result suggests that fission product neutrinos are actually antineutrinos and that these are different from the neutrinos required for the Cl^{37} reaction. The large lower limits found for the lifetimes in the double β decay of Ca^{48} ($>2 \times 10^{18}$y) and Zr^{96}($>5 \times 10^{17}$y) also suggest that neutrinos and antineutrinos are different.

The antiproton[1] and the antineutron[2] were discovered within recent months. These particles may play an important role in nuclear physics, but as far as low energy nuclear physics is concerned, they appear only in virtual processes. For this reason we have not included them in the nuclear family of our tables.

A great deal of work continues to be reported on the positions and spins of low-lying levels since these are important for testing nuclear models. In the very light region the detailed theoretical calculations of Kurath[3] and Lane[4] on intermediate coupling, the α-particle model results as summarized by Inglis[5] and the shell model computations of Elliott and Flowers[6] and of Redlich[7] for nuclei just above O^{16} offer definite predictions for experimental verification. There are not yet sufficient data to make possible a general statement about any of these models but some points of interest are noted.

In the matter of a possible level in He^4 at ~ 22 Mev which might be expected on a shell picture, it has been shown by the 1956 data that there definitely are maxima (at points corresponding to a level at this energy) in the cross section curve for $H^3(p,n)$ and in the total neutron cross section of He^3. However, no trace of such a level is to be found by He(p,p') for proton energies of 28 and 40 Mev. Selove[8] has pointed out that the $H^3(p,n)$ results can be accounted for by the direct interaction picture.

Neither the α-particle model nor the intermediate-coupling picture predicts levels in Be^8 between ground and ~ 9 Mev other than the well known state at 2.9 Mev. During the year results of careful studies were made of the reactions $Li^7(p,\gamma)$, $Li^6(He^3,p)$, and $B^{10}(d,\alpha)$ and no evidence of an additional level found. However, results from a careful experiment by $Be^9(d,t)$ show a possible level at 2.2. Several levels were reported by $C^{12}(\gamma,\alpha)$ and $Li^7(d,n)$ but the methods necessarily used for studying these reactions cannot claim the good statistics of those used with the previously mentioned processes.

The number and character of the low-lying states in Be^9 and B^9, which are important for testing the intermediate coupling model, are not yet settled. The model predicts two low-lying odd-parity states while the data show that possibly there are three such levels in Be^9.

A new and unpredicted level has been reported in B^{10} by Li^7 (α,n).

A search for a possible low-lying isomeric level in N^{16} of approximately the same lifetime as the ground state brought negative results.

A level at 8.87 Mev in O^{16} has been shown to have a spin-parity of 2^-. Such a level cannot be accounted for by the alpha-particle model.

Careful measurements on the β^+ branching in O^{14} and the 2.31-Mev γ-ray lifetime in N^{14} support the hypothesis that the long lifetime of C^{14} is due to accidental cancellation in the matrix element for the decay.

Shell-model predictions for states in O^{18} between 1.9 and 3.5[6,7] do not seem to be fulfilled although a number of nuclear properties in the region A = 17 to A = 19 are fairly well accounted for. A great deal of work has gone into the level structure of F^{19} during the past year. There are now altogether three low-lying levels not predicted by the model but the question as to whether

they are all of negative parity, and therefore not to be expected from the current calculations, has not yet been settled.

As pointed out by Wilkinson,[9] E1 and M1 transitions in the light nuclei can be reasonably well accounted for by the shell model. (All couplings give about the same result). The transitions are all slower than the single-particle expectations. However, for higher multipoles some transitions faster than predicted by a single-particle model have been found. These suggest some type of collective motion even for nuclei composed of a small number of particles. The technique of measuring such lifetimes by the study of the Doppler shifts is increasing the amount of data in this field.

Two other new techniques which are providing new data in the regions of both light and heavy elements consist of He^3 bombardment and "neutron threshold" detection. He^3 beams are being used now at Chalk River, Naval Research, Oak Ridge, Rice Institute, and possibly elsewhere. Reaction mechanisms are being investigated and products studied. By observing the ratio of slow to fast neutrons in a BF_3 and "long counter" respectively, the Rice Institute group has developed a powerful method for the study of reactions which result in neutron emission. Techniques similar to this are also being used by other groups.

Extensive studies of the levels in Al^{25} and Al^{26} have been made by means of the (p,γ) reaction. The Chalk River group, who investigated Al^{25}, have pointed out that the level scheme of this nucleus can be well explained by the collective model. This is a very surprising result for a nucleus as light as Al^{25}.

In the region $A \sim 30$, the energies of many levels were precisely determined during the year by means of charged particle reactions such as (p,p'), (d,p), (p,α), and (d,α). One hundred levels in Al^{28} have been established by the (d,p) reaction.

The 0.69 Mev level in P^{30} has been considered to be a $T = 1$ state. Studies of the (p,γ) reaction supported this interpretation. However, recently a high yield of this level from (d,α) has been noted. This casts some doubt on the $T = 1$ assumption since only $T = 0$ levels are expected from this reaction.

Detection of $\gamma^{\pm}$ from P^{32} in a very careful experiment gave the first reliable positive evidence for internal pair creation accompanying β decay. This result does not settle the question of the existence of a new positive particle, other than the positron, which has been suggested by some studies of the P^{32} decay.

A new geological determination of the ratio of electron capture to β decay in K^{40} by the measurement of the A^{40} present in minerals of known ages gives a value (0.117 ± 0.015) considerably higher than before. The result is in reasonable agreement with that found from counting methods (0.124 ± 0.002).

Spins of Co^{56} and Co^{60} were measured by the paramagnetic resonance method, which gave 4 and 5 respectively. Precise values of $|\mu|$ were also obtained for these two nuclei by the same method. Previous values of $|\mu|$ measured by the nuclear alignment method do not agree well with the new values. In this connection it is interesting to note that the shape of the β spectrum to the 2^+ level has been determined to be of the type ($\Delta J=3$, no) rather than of the type ($\Delta J=2$,no) which was previously accepted. A new and lower value of the β branching to this level is also consistent with this interpretation.

A forbidden shape of the γ continuum accompanying electron capture has been noted in Ni^{59}.

In the ratio of L to K electron capture in Ge^{71} a large discrepancy exists between the theoretical (0.11) and the experimental value (0.25 ± 0.02). However, the present experimental ratio depends upon the value of the fluorescence yield which is not too well known in this region.

Application of the Coulomb excitation method to the study of low-lying nuclear levels has been continued by several groups. The use of enriched materials has made definite isotopic assignment possible in many cases.

In contrast to previous reports citing evidence for the existence of primordial Tc^{98}, an Oak Ridge paper of 1956 by Boyd and Larson describes a fruitless search for this nucleus in 16 ores. Small amounts of 6.7^h Tc^{99} detected in 2 samples after neutron irradiation were believed produced from traces of 2.2×10^{5y} Tc^{99} which may have been present in the original sample or introduced as an impurity.

Internal conversion of the 0.163-Mev γ of 12^d Xe^{131} was shown by Snell and Pleasanton to give rise to some surprisingly large cascades of Auger electrons. Charges from 1 to 21, with an average of about eight were found on the recoiling Xe^{131} ions. Similar results have been obtained for Rb^{85} which results from the β decay of Kr^{85}.

Last year Scharff-Goldhaber and Weneser pointed out a dramatic change which takes place in the spacing of the levels of even-even nuclei between nuclei containing 88 and those containing 90 neutrons. The ratio of the energy of the second excited state to that of the first excited state jumps from ~2.2 to ~3.3. This year Grodzins and Kendall investigated the decay scheme of Eu^{152} with 89 neutrons and found that its transitions to Gd^{152} with 88 neutrons have smaller ft's than those to Sm^{152} with 90 neutrons. Thus Eu^{152}

is more akin to the 2.2-ratio than the 3.3-ratio family. Scharff-Goldhaber[10] has now shown that a change from a 2.2 to 3.3 ratio also takes place between proton numbers 86 and 88. The region where the change is from 3.3 down to 2.2 is for neutron numbers 112 to 114.[11]

In a search for unknown stable isotopes of very low abundance, relative isotopic abundances for some twenty-five elements were measured. No new stable nucleus was found.

The discovery of a first excited state in La^{137} ten kilovolts above ground has made it reasonable to assign a spin of $7/2^+$ rather than the previous $5/2^+$ to the ground state. This makes the electron capture to the Ba^{137} ground state second forbidden, rather than allowed, and thus consistent with its long lifetime of $\sim 10^5$ years.

Work on the neutron cross section of Xe^{135}, first declassified for the 1955 Geneva meeting, has now been published in detail. Measurements of the total cross section as a function of energy has led to the conclusion that the capture cross section at resonance is 55% of the maximum possible theoretical value if the spin of the capturing state is 2 and 80% if it is 1.

The latest half-life of Rb^{87} obtained by counting methods $(4.3 + 0.3, -0.2) \times 10^{10}$ y, is still not in good agreement with the value obtained by measurement of the ratio Rb^{87}/Sr^{87} in minerals, namely $(5.0 \pm 0.2) \times 10^{10}$ y.

The atomic beam resonance method has been used by Hubbs et al. for measuring the spins of Rb isotopes 81 through 84 all of which are radioactive. The minimum half-life limit set by the equipment is only 10 minutes. Together with previous data there are now measured spin values of Rb isotopes from Rb^{81} through Rb^{87}. The spins of the odd A-isotopes are consistent with the predictions of the shell model and those of even-A isotopes are correctly given by Nordheim's strong rule. This is the first sequence of data in what promises to be a very fruitful attack on the spins of radioactive nuclei.

New instruments of high resolution have been used in the study of the nuclear energy levels of the heavier elements this year. A slow-neutron velocity spectrometer employing a pulsed neutron source from the Nevis synchrocyclotron at Columbia University has been constructed. Data from this instrument show 31 resonances in Ta^{182} between neutron energies of 35 and 215 ev as compared with 16 reported from chopper work by a Russian group.

At the Argonne National Laboratory a bent crystal spectrometer which makes possible the study of low energy neutron capture γ rays was placed in operation. Fourteen γ rays with energies between 0.26 and 0.44 Mev have been reported in Au^{198}. From scintillation spectrometer work only one γ ray in the energy range of 0.1 to 2.5 Mev was reported.

At Uppsala an iron free double-focusing β-ray spectrometer has been constructed which makes possible the comparison of two momenta with an accuracy of one part in 10^5. When X-ray energies are used for calibration, absolute H_ρ values with errors of one in 10^4 result. The resulting accuracy is slightly better than that achieved in previous determinations.

The success of the collective model in the very heavy and rare earth regions continues. The energy levels in Lu^{175} (from the decay of Y^{175}) have been accounted for on this model by Chase and Wilets.[12] The nine levels below 0.45 Mev reported last year in W^{183} from the decay of Ta^{183} have been interpreted in terms of two intermixed rotational bands by Kerman.[13] The 5.5^h isomeric transition in Hf^{180} has been found to be due to an E1 0.057-Mev γ. The great slowness of the transition (10^{-5} of the single proton estimate) can be accounted for by K forbiddenness ($\Delta K=9$).

But perhaps the greatest triumphs of the collective model have come from the spins and magnetic moments of ${}_{69}Tm^{169}_{100}$, ${}_{72}Hf^{177}_{105}$, and ${}_{72}Hf^{179}_{107}$. The measured values are $J = 1/2$, $\mu = -0.20$; $J = 7/2$, $\mu = +0.61$; and $J = 9/2$, $\mu = -0.47$ respectively. The shell model predicts $J = 1/2$ for Tm^{169} but requires an $S_{1/2}$ state for which the magnetic moment would be positive. The collective model, however, predicts a negative moment. For the Hf isotopes, $f_{7/2}$, $h_{9/2}$ states are possible single-particle states in the neutron region between $N = 82$ and $N = 126$ (although they should both be filled at $N = 100$). Here again, however, these shell model assignments would require negative and positive magnetic moments respectively, just the opposite from those observed. The Hf spins are given correctly by the collective model[15] but no estimates of the moments have been made.

The collective model also accounts for the new spin values of ${}_{64}Gd^{155}_{91}$, ${}_{64}Gd^{157}_{93}$, ($J = 3/2$ for both) and ${}_{66}Dy^{161}_{95}$ ($J = 5/2$)[15] which on the shell model would have to be attributed to $p_{3/2}$, an orbital not expected until $N = 107$, and to $f_{5/2}$ respectively. The Gd isotopes both have negative moments. The sign of the Dy moment is not known.

A careful measurement[16] of the K, L_1, L_2, and L_3 internal conversion coefficients of the 0.279-Mev γ of Tl^{203} following the β decay of Hg^{203} shows that these quantities are lower than the magnetic dipole K, L_1, and L_2 internal conversion coefficients calculated by Rose by a factor of 0.53 ± 0.08. Calculations by Sliv[17] taking into account finite nuclear size indicate values for K and L_1 mag-

netic dipole conversion coefficients for Z = 83 which differ from Rose's by a factor of 0.65.

A survey of the elements for γ transitions with half-lives >10 μs resulted in the discovery of 7 new transitions with half-lives between 16 and 12,000 μs from bombardment of As, Mo, Pd, W, Tl, and Bi with γ rays from a 24-Mev betatron.[18]

A new level at 0.6189 Mev has been discovered in the much investigated decay scheme of Hf^{181}.

The decay of Pb^{205} by L capture with a half-life of 5×10^{7} y has finally been observed.

Summaries of data on slow neutron resonances by Levin and Hughes[19] and by Landon[20] show that Γ_γ is almost constant for the different levels of a given nucleus and that in general it decreases slowly with A except for a marked peak at A = 208. This result can be accounted for by assuming a level density equal to $ce^{\sqrt{aE}}$, the observed discontinuities in the neutron binding energies at the magic numbers, and El transitions. However, the absolute value of the widths as calculated with a modified independent particle model are larger by an order of magnitude than the experimental values.[19]

Intercomparison of boron samples by British and American laboratories resulted in cross sections differing by about 20 barns, the British values being the larger. This year measurement of the cross section of the Harwell standard by an Oxford group using a mean-life method gave a result of 760 ± 3 barns, a value in good agreement with the American value for this sample of 759 ± 5 barns found by transmission measurements. In both cases measurements were not made on the standards directly but on samples with which the standards were later compared by the pile oscillator method. Causes of discrepancies are not yet clear.

This year a paper written jointly by the groups at Argonne National Laboratory and the University of California reported the "instantaneous" absorption of neutrons by uranium in the high neutron flux of thermonuclear explosion of November 1952 resulting in the production of isotopes of uranium up to U^{255} as evidenced by their β decay products. Many of these product nuclei first characterized in the thermonuclear experiment have since been produced by long-time pile irradiations. One of the most interesting of these, Cf^{254} has been shown to decay predominantly by spontaneous fission with a half-life of 55 days. The equality of this decay time with that of supernovae of Type I has led to the suggestion that this nucleus is produced in the stellar outburst by a type of "instantaneous" absorption similar to that occurring in the H bomb explosion and that its half-life governs the decrease in light intensity of the fading star.[21]

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CONVENTIONS

All energies are given in Mev and all cross sections in barns unless otherwise stated in the tabular material.

Numerals in italics, following measured values, are the errors (as reported by the authors) in the last figure of the values. In cases where confusion seems possible, the conventional ± is used.

Magnetic moments are reported as before without diamagnetic correction. They are based on $\mu(H) = 2.79267$ and the substandards listed by H. Walchli, ORNL-1469.

In writing reactions, the upper right hand superscript denoting A, the mass number of the target nucleus, is given without parentheses when the target was monoisotopic or when enriched (or depleted) material was used to establish the identity of the reacting isotope. It is given in parentheses when natural material was used and when the identity of the reacting isotope was strongly suggested by its predominating abundance, the observed reaction energy, or the activity or yield of the end product. It is given in parentheses with a question mark when the target A was assigned by systematics, elimination, etc. For instance, "B^{10}(d,p)" means that the proton groups from the deuteron bombardment of B^{10} were identified by comparing effects in B^{10} enriched and natural B samples. "B^{11}(d,p)" means that the assignment to B^{11} was made by using B^{11} depleted and natural B samples. "$C^{(12)}$(d,p)" means that natural C was used to study the reaction, but, because of the 99% abundance of C^{12}, the reaction observed was assumed to take place in that isotope. In the reaction "$Sn^{(116)}$(n,p)$13^{s}In$," the Sn isotope was identified by the In product. "$Te^{(125?)}$(d,p)$Te^{(126?)}$" indicates that from the trend of Q values in the region, the experimenters believed that their measured Q most likely belonged to the indicated reaction.

When a method of production of a radioactive nucleus is given, the lowest bombarding energy used by the experimenter is indicated; e.g., Ag(20-Mev p,n).

The large black dots on the decay schemes are used to indicate experimentally established coincidences. α, β, or γ rays entering a level and dotted at their arrowheads have been shown to be in coincidence with gamma rays leaving the same level and dotted at their origins. In case of a simple cascade, the dots of the incoming and outgoing rays are superimposed. Dashes are used for doubtful radiations or levels.

For the light nuclei, energy levels in the compound nucleus are usually tabulated rather than the resonant energy of the bombarding particle. The binding energy of the bombarding particle in the compound nucleus is taken from the table of F. Ajzenberg, T. Lauritsen, Revs. Modern Phys. 27, 77(1955) for $Z < 11$ and from P. M. Endt, J. C. Kluyver, Revs. Modern Phys. 26, 95(1954) for Z from 11 to 20.

ABBREVIATIONS

a	absorption
a $\beta\gamma$	absorption of β's in coincidence with γ's
a ce	absorption of conversion electrons
a coin	absorption of photoelectrons between counters in coincidence
act	neutron detection by activation (Mn, Rh, Ag, ...)
α	total γ-ray conversion coefficient, N_e/N_γ
$\alpha_K, \alpha_L, \ldots$	γ-ray conversion coefficient for electrons ejected from the K, L, ... shell
$\alpha_o, \alpha_1, \ldots$	α to g.s., first excited state, ... of residual nucleus
B	band spectra method
B(E2)	reduced E2 excitation probability in barns^2 (upward transition)
Be(γ,n)	measurement by detection of photoneutrons from Be
BF_3	boron trifluoride neutron counter
B_n, B_p	neutron, proton binding energy, i.e., energy necessary to remove particle from nucleus
$\beta\gamma$ (t_-)	polarization-direction correlation of β's and γ's in coincidence
$\beta\gamma(\theta)$	angular correlation of β's and γ's in coincidence
calc	calculated from experimental work reported elsewhere
cc	cloud chamber
CcW	Cockcroft Walton accelerator
ce	conversion electrons
chem	chemical separation of product following reaction
Cp	Compton
crit a	critical absorption
cryst	crystal spectrometer
cyc	cyclotron
d	(1) deuteron, (2) descendant of, (3) days, when used as superscript
D	double resonance method
d,p(θ)	angular distribution of protons with respect to deuteron beam
D(γ,n),D(γ,p)	measurement by detection of photoneutrons or photoprotons from deuterium
E	average energy
E_o	resonance energy
$E_\beta, E_\gamma, \ldots$	energy of β ray, energy of γ ray,
E_{dis}	disintegration energy
EA	electrostatic analyzer
E1,E2, ...	electric dipole, electric quadrupole, ...
E_ϵ	energy of the electron capture transition (end point of γ continuum + K binding energy)
e_A	Auger electron
e_{AK}, e_{AL}	KXY, LXY Auger electron
el	elastic scattering
ϵ	electron capture
ϵB(E2)	partial B(E2) for radiation studied (photon, ce_K, or ce_L)
ϵ_K, ϵ_L	electron capture from K, L shell
$\eta(\theta)$	$[W(\theta) - W(\pi/2)]/W(\pi/2)$, a measure of asymmetry in angular distributions, where $W(\theta)$ is the count at angle θ
f	fission
F-K	Fermi-Kurie plot
ft	comparative half-life in the Fermi theory of β decay calculated for an allowed transition. Superscript 1, 2, or 3 on *f* indicates that comparative half-life is calculated for a unique 1st, 2nd, or 3rd forbidden transition.
g	(1) gyromagnetic ratio (2) statistical weight factor, $\frac{1}{2}[1 \pm 1/(2J+1)]$, in g Γ_n
Γ	resonance half-width (the whole width at half-maximum)
Γ_γ, Γ_n	partial resonance half-width for γ, neutron emission
$\gamma^\pm$	annihilation radiation
γ continuum	continuous γ spectrum associated with electron capture
$\gamma(Hg^{198})$	γ is emitted from nucleus in parentheses rather than from radioactive parent
$\gamma(\theta,T)$	γ intensity as function of angle and temperature
$\gamma\gamma$, $\beta\gamma$, $\alpha\gamma$, nγ	$\gamma\gamma$, $\beta\gamma$, $\alpha\gamma$, or nγ concidences. (0.123 γ)(0.246 γ, 0.325 γ) means 0.123 γ in coincidence with 0.246 γ and 0.325 γ
$\gamma\gamma(\theta)$	angular correlation of γ's in coincidence
$\gamma\gamma(t_-)$	polarization-direction correlation of γ's in coincidence
GM	Geiger-Müller counter
g.s.	ground state
h	hours

I	nuclear induction method
IB	internal bremsstrahlung
ic	ionization chamber
IT	isomeric transition
J	spin in units $h/2\pi$
K/L, K/LM	α_K/α_L, $\alpha_K/(\alpha_L + \alpha_M)$
L_1L_2/L_3	$(\alpha_{L_1} + \alpha_{L_2})/\alpha_{L_3}$
l	orbital angular momentum
Lin	linear accelerator
m	(1) medium intensity, (2) minutes, when used as a superscript
M	molecular or atomic beam resonance method
M1,M2, ...	magnetic dipole, magnetic quadrupole, ...
mb	millibarns
Mev	million electron volts (10^6 ev)
mev	millielectron volts (10^{-3} ev)
Mic	microwave method
mir	measurement by total reflection of neutron beam from mirror surface
mod cyc	modulated cyclotron
ms	(1) milliseconds, 10^{-3}s (2) mass spectrometer
mμs	millimicroseconds, 10^{-9}s
μ	nuclear magnetic moment (nuclear magnetons)
μ_3	nuclear magnetic octopole moment (nuclear magneton barns)
μs	microseconds, 10^{-6}s
μμs	micromicroseconds, 10^{-12}s
n res	known resonance of a "standard" element used to identify an unknown neutron energy
ν	neutrino
osc	pile oscillator method
θ^2	reduced level width in units of $3h^2/8\pi^2MR$
p	(1) proton, (2) predecessor of
para	paramagnetic resonance method
parentheses	parentheses are put around values which are given for identification purposes
pc	proportional counter
pe	photoelectrons
ppl	photoplates or emulsions
pr	electron-positron pair
p res	proton resonance. Magnetic field standardized by means of proton resonance frequency
primes	primes indicate inelastically scattered particles
q	electric quadrupole moment in units of barns
quad res	quadrupole resonance method
q_4	nuclear electric 16-pole moment in units of 10^{-48} cm^4
Q	reaction energy in Mev
R	nuclear radius in fermis (10^{-13} cms)
s	(1) spectrometer method, (2) seconds, when used as superscript
s coh	coherent scattering
S	atomic spectra measurement
scin	1-crystal scintillation counter
scin Cp	2-crystal scintillation counter
scin pr	3-crystal scintillation counter
sd	double focusing spectrometer
sl	lens spectrometer
sl ce	conversion electrons measured in lens spectrometer
sr	steradian
st	strong
sπ	180° spectrometer
sπ pr	180° pair spectrometer
σ	cross section in barns
σ_o	cross section at resonance energy, E_o
σ_a	absorption cross section
σ_t	total cross section
Σpc	proportional counter used to sum energy of transitions in cascade
Σscin	scintillation counter used to sum energy of transitions in cascade
t	(1) triton, H^3, (2) total cross section when used under σ in cross section list
T	(1) isotopic spin, (2) temperature
τ	half life in units indicated
τ_1,τ_2	half life of upper, lower state
$\tau_{\beta\beta},\tau_{\epsilon\epsilon}$	half life for double β, double ϵ decay
th	thermal
thresh	threshold
trans	transmission
VdG	Van de Graaff accelerator
w,vw	weak, very weak
ω_K,ω_L	K, L fluorescence yield
x	x radiation
y	years
$Y_\gamma, Y_p, \ldots$	yield of γ rays, yield of protons, ...
%	number per 100 disintegrations. For γ's, total number of photons plus ce's is meant
†	number relative to other numbers marked †. For γ's, number of photons only is meant
+,−	even, odd parity when used in connection with level properties

Standard journal abbreviations are used.

LIST OF JOURNALS SURVEYED FOR NSA VOL. 10

Numbers following a colon are issue numbers, other numbers (except years) are volume numbers. All numbers are inclusive.

Acad. Brasileira Ciencias 22-27(1950-1955).
Acta Physica Hung. 5: 2-4(1955); 6: 1(1956).
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Ann. Physik 16,17(1955); 18: 1-4(1956).
Arkiv Fysik 9: 6(1955); 10: 1-6(1956).
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Bull. Am. Phys. Soc. 1: 1-6(1956).
Bull. Inst. Nuclear Sci. Boris Kidrich 6(1956).
Bull. Research Council Israel 5A: 1-3(1955-56).
Can. J. Chem. 33: 12(1955); 34: 1-9(1956).
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Compt. rend. 241: 14-26(1955); 242: 1-26; 243: 1-17(1956).
Current Sci. 24: 10-12(1955); 25: 1-9(1956).
Czechoslov. J. Phys. 6: 1-3(1956).
Doklady Acad. Nauk SSSR 98: 4-6; 99(1954); 100, 101, 102, 103, 104, 105(1955).
Helv. Phys. Acta 28: 4-7(1955); 29: 1-2(1956).
Indian J. Phys. 29: 6-12(1955); 30: 1-4(1956).
Izvest. Acad. Nauk Ser. Fiz. SSSR 19: 1-2(1955).
J. Am. Chem. Soc. 77: 22-24(1955); 78: 1-20 (1956).
J. Chem. Phys. 23: 11-12(1955); 24: 1-6; 25: 1-2(1956).
J. Inorg. Nuclear Chem. 1: 1-6(1955); 2: 1-6 (1956).
J. Nuclear Energy 2: 2-4(1955-56).
J. Phys. Chem. 59: 11-12(1955); 60: 1-9(1956).
J. phys. radium 16: 11-12(1955); 17: 1-9(1956).
J. Phys. Soc. Japan 10: 11-12(1955); 11: 1-8 (1956).
J. Research Nat. Bur. Standards 55: 5-6(1955); 56; 57: 1-4(1956).
Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 29: 15-19(1955); 30: 1-16(1956).
Nature 176: 4488-4496(1955); 177; 178: 4523-4538(1956).
Naturwiss. 42: 21-24(1955); 43: 1-20(1956).
Nuclear Phys. 1: 1-8(1956).
Nuclear Sci. Eng. 1: 1-5(1956).
Nuovo Cim. 2: 5-6(1955); 3: 1-6(1956).
Phil. Mag. 46: 381-383(1955); 1: 1-8(1956).
Physica 21: 10-12(1955); 22: 1-9(1956).
Phys. Rev. 100(1955); 101; 102; 103: 1-4(1956).
Proc. Indian Acad. Sci. 33-43(1951-1956).
Proc. Phys. Soc. 68A: 430-432(1955); 69A: 433-438(1956).
Proc. Roy. Soc. 233A(1955); 234A-236A(1956).
Rev. Mexicana Fis. 4: 4(1955); 5: 1-2(1956).
Zhur. Eksptl' i Teoret. Fiz. 28(1955).
Z. Naturf. 10a: 9-12(1955); 11a: 1-9(1956).
Z. Phys. 141-143(1955); 144; 145: 1-4(1956).

For information on reports and occasional papers in journals other than the above, Nuclear Science Abstracts, Chemical Abstracts, and Physics Abstracts are surveyed.

1. RADIOACTIVITY, LEVELS, ABUNDANCES, MOMENTS

?

α tracks of ranges 3 to 4, 10, and 14μ (energies 1 to 1.5, 3, 4 Mev) seen in ppl after immersion in solutions of Fe salts. 3 to 4μ tracks sometimes found without others which seem to have $\tau \leq$ several days.

R.Coppens, Compt. rend. 243, 582 (1956).

155 tracks (range 100 to 300μ, not electrons) observed in ppl from Pu^{239} source. Similar tracks seen with active deposit of Po, Ac, and Th.
About one "long" track per 10^7 normal α's

M.Ader, J. phys. radium 17, 541 (1956); Compt. rend. 241, 1748 (1955).

ν

Neutrino detected by establishing, near nuclear reactor, the existence of $p + \nu \rightarrow n + \beta^+$ through observation of (1) coincident pulses due to $\gamma^{\pm}$, (2) coincident pulses due to γ's following n capture, (2) being delayed with respect to (1).
$\sigma[H^{(1)}(\nu,\beta^+)n] = 10^{-19}$ b for fission ν

$\mu(\nu) \quad < 10^{-9}$ Bohr magnetons
from counting rate of single pulses assumed due to e^-,ν interaction

C.L.Cowan, Jr., F.Reines, F.B.Harrison, H.W. Kruse, A.D.McGuire, Science 124, 103 (1956); Nature 178, 446 (1956); Phys. Rev. 96, 1294 (1954).

$\sigma[Cl^{37}(\nu,e^-)A^{37}] < 0.9\times10^{-21}$b for fission ν

R.Davis, Jr., Bull. Am. Phys. Soc. 1, No. 4, 219 UA5 (1956).

$n^1_{0\ 1}$

Neutron electron interaction
$V = -4120 \pm 300$ ev (range $= e^2/mc^2$) from transmission in liquid Bi, $E_n = 0.1$ to 10 ev

E.Melkonian, B.M.Rustad, W.W.Havens, Jr., Bull. Am. Phys. Soc. 1, No. 1, 62, UA8 (1956); verbal report.

μ -1.913138 M
$\nu(n)/\nu(p) = 0.685057$ *16*

N.E.Corngold, V.W.Cohen, N.F.Ramsey, Bull. Am. Phys. Soc. 1, No. 1, 11, B7 (1956).

$n^1_{0\ 1}$ β^- sl for β's from $p\beta(145° < \theta < 175°)$
$p\beta^-(E_\beta)$ consistent with $g_T^2/g_S^2 = 1.49\ ^{+1.44}_{-0.56}$
12^m

J.M.Robson, Phys. Rev. 100, 933 (1955).

$H^1_{1\ 0}$ μ 2.79268 *10*
Used Jeffries type decelerating cyclotron
Value given is without diamagnetic correction

K.R.Trigger, Bull. Am. Phys. Soc. 1, No. 4, 220 UA8 (1956); priv. comm.

$H^2_{1\ 1}$ Capture γ $H^{(1)}(n,\gamma)$ E_n = th
100† (2.23) scin
No other γ (<3†)

T.H.Braid, Phys. Rev. 102, 1109 (1956).

$H^3_{1\ 2}$ τ 12.262^y 4 He^3 growth
12^y

W.M.Jones, Phys. Rev. 100, 124 (1955).

$H^4_{1\ 3}$ $C^{(12)}$(300, 430-Mev p)
No evidence for β emitter, $E_\beta > 12$, τ = 1 to 10^{ms}
$\sigma(\tau = 2$ to $4^{ms}) < 10^{-6}$ a, delay
$\sigma(\tau = 4$ to $10^{ms}) < 10^{-5}$

A.A.Reut, S.M.Korenchenko, V.V.Yur'ev, B.M. Pontecorvo, Doklady Akad. Nauk SSSR 102, 723 (1955); AERE Lib/Trans. 600.

$He^4_{2\ 2}$ Level $H^3(p,n)$ E_p = 1.4 to 6.8
100* 22 $J = 2^-$ $p,n(\theta)$; BF_3
σ has broad max at $E_p = 3$. Large $\int d\sigma$ at max (0.58) implies $J = 2$. Increase with E_p of asymmetry in $p,n(\theta)$ suggests 1^- level at >25
*Peak $\sigma(0°)$ in mb/sterad

$H^3(p,\gamma)$ E_p = 1.7 to 6.8
No resonance observed scin >14-Mev γ

N.A.Vlasov, S.P.Kalinin, A.A.Ogloblin, V.A. Sidorov, V.I.Chuev, Soviet Phys. JETP 1, 500 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 639 (1955).

Level? $He^3(n)$ E_n = 0.2 to 22
σ_t shows broad maximum at $E_n = 1.9$?

L.Cranberg, R.L.Mills, T.R.Roberts, R.B. Beyster, R.B.Day, R.L.Henkel, R.A.Nobles, R.K.Smith, S.G.Sydoriak, R.G.Taylor, M.Walt, LA-1853 (1954).

He^4_2 $He^{(4)}(p,p')$ $E_p = 28$
$He^{(4)}(p,2p)$ cc
No level found $\sigma(p,p') < 2$ mb

A.P. Wickersham, UCRL-2662 (1954).

$He^{(4)}(p,p')$ $E_p = 40$
No level found between 23 and 28 Mev scin
$\sigma(65°) \leq 0.25$ mb/sterad if $\Gamma < 0.5$

R.M. Eisberg, Phys. Rev. 102, 1104 (1956); Bull. Am. Phys. Soc. 1, No. 1, 19 DA1 (1956).

$H^2(d,n)$ $E_d = 0.039$ to 0.087
$H^2(d,p)$ He^3, H^3 detected, pc

E_d	0.0387	0.0522	0.0647	0.0869
A_n		0.654 *23*		0.931 *26*
A_p		0.360 *23*		0.503 *17*
σ_n in mb		4.64 *27*		11.85 *83*
σ_p in mb		4.59 *34*		11.41 *65*
σ_n/σ_p	0.996 *20*	1.008 *17*	1.030 *18*	1.038 *13*
$\sigma_n(90°)/\sigma_p(90°)$		0.926 *14*		0.925 *11*

A_n, A_p are the neutron and proton asymmetry coefficients in $\sigma(\theta) = \sigma(90°)[1 + A\cos^2\theta]$

D.L. Booth, G. Preston, P.F.D. Shaw, Proc. Phys. Soc. 69A, 265 (1956).

$H^2(d,n)$ $E_d = 0.25$ to 0.82
d,n(θ,E) studied. Less isotropy found than in previous work. Stripping-theory fit possible if R assumed to decrease as E_d increases.
2 crystal delay spectrometer

P.R. Chagnon, G.E. Owen, Phys. Rev. 101, 1798 (1956).

$H^2(d,n)$ $E_d = 1.15$ to 4.60
Table of $\sigma(0°)$ given ppl

$H^3(p,n)$ $E_p = 8.8$ to 11.4
Table of $\sigma(0°)$ given ppl
$\sigma(0°)$ increases with E_p from 16 to 31 mb/sterad

L. Stewart, G.M. Frye, Jr., L. Rosen, Bull. Am. Phys. Soc. 1, No. 2, 93, M2 (1956).

He^5_2 Level $Li^{(7)}(d,\alpha)$ $E_d = 3.7$
g.s. Q = 13.719 *20* s

L.M. Khromchenko, V.A. Blinov, Soviet Phys. JETP 1, 596 (1955); Zhur. Eksptl'. i Teoret. Fiz. 28, 741 (1955).

$H^3(d,n)$ $E_d = 0.2$ to 6.25
Tables of $\sigma(\theta,E)$ given pc, scin

S.J. Bame, Jr., J.E. Perry, Jr., Bull. Am. Phys. Soc. 1, No. 2, 93, M3 (1956).

$H^3(d,n)$ $E_d = 1$ to 5; pc + scin
No sharp resonance but σ rising at $E_d = 5$
Forward peak in d,n(θ) sharper with higher E_d

C.H. Johnson, A. Galonsky, Phys. Rev. 100, 1252A (1955).

He^5_2 Polarization $H^2(d,n)$; $He^{(4)}(n,n)$
Azimuthal asymmetry of n's scattered from He studied. Results consistent with polarization calc. with Seagrave[1] not Huber[2] phases.

I.I. Levintov, A.V. Miller, V.N. Shamshev, Doklady Akad. Nauk SSSR 103, 803 (1955).
[1]Phys. Rev. 92, 1222 (1953).
[2]Helv. Phys. Acta 25, 437 (1952).

He^6_2 τ 0.852^S *16* Be^9(pulsed n,α)
0.83[a]

N. Veeraraghavan, Proc. Indian Acad. of Sciences 43A, 319 (1956).

τ 0.817^S Be^9(pulsed n,α)

E.C. Campbell, P.H. Stelson, ORNL-2076 p. 32 (1956).

He^6_2 Levels $Li^{(7)}(t,\alpha)$ $E_t = 0.84$
1.3* g.s. Q = 9.79 *14* ppl 90°;
2.1* 1.7 γ decay $E_t = 3.8$
6.0 ? *9* α decay ? ppl loaded
9.3 *7* α decay with Li
*$\sigma(90°)$ in mb/sterad for $E_t = 0.84$

D. Magnac-Vallette, P. Cüer, J. phys. radium 17, 553 (1956); Compt. rend. 242, 760 (1956).

$H^3(t,t)$ $E_t = 1.6$ to 2.0
$\sigma(\theta,E)$ measured. No evidence of He^6 excited state between 13.05 and 13.25 pc in coinc

D.M. Holm, H.V. Argo, Phys. Rev. 101, 1772 (1956).

Li_3 Relative isotopic abundances ms
Li^6 8.12% $Li^7/Li^6 = 11.32$
Li^7 91.88% No error given
No Li^5 ($< 7 \times 10^{-5}$%) No Li^8 ($< 1 \times 10^{-4}$%)

F.A. White, T.L. Collins, F.M. Rourke, Phys. Rev. 101, 1786 (1956).

Li^5_3 Polarization $He^{(4)}(p,p)$; (p,p) ppl
$E_{p1} = 5.32$, $\theta_1 = 45°$ for 1st scattering, S_1
$E_{p2} = 2.7$, $\theta_2 = \pm 90°$ for 2nd scattering, S_2
P_1, polarization after S_1, = 0.40 ± 0.05 agreeing with $P_1 = 0.39 \pm 0.04$ calc. from phase shifts. $p_{1/2}, p_{3/2}$ splitting of several Mev implied.

A.C. Juveland, W. Jentschke, Z. Phys. 144, 521 (1956).

Polarization $He^{(4)}(p,p)$; (p,p) $E_p = 3.0$; ppl
$\theta_1 = 90°$ c.m.; $\theta_2 = \pm 73°$, $\pm 100°$, $\pm 125°$ c.m.
P_1P_2 from forward-backward ratio agrees with value calculated from phase shifts

M.J. Scott, R.E. Segel, Phys. Rev. 100, 1244 (1955).

$Li^{5}_{3\ 2}$ Capture γ's $H^2(He^3,\gamma)$ $E_{He^3} \leq 1.5$; scin
$E_\gamma(max) \sim 16.5$, spread in $E_\gamma \sim$ several Mev

W. E. Kunz, J. W. Butler, H. D. Holmgren, Phys. Rev. 100, 1252A (1955).

$He^{(4)}(p,p)$ $E_p = 7.5$, 31 angles
Phase shifts agree with values for lower E_p

T. M. Putnam, J. E. Brolley, Jr., L. Rosen, Bull. Am. Phys. Soc. 1, No. 1, 9, AB2 (1956).

$He^{(4)}(p,p)$ $E_p = 17.45$
$p,p(\theta)$ found for $6.8° < \theta < 168°$ c.m. scin
Phase shifts given

K. W. Brockman, Jr., Phys. Rev. 102, 391 (1956).

$Li^{6}_{3\ 3}$ Levels $Li^{(7)}(p,d)$ $E_p \sim 18$

17†	g.s.	$l_n = 1$	p,d(θ)
8.5†	(2.19)	$l_n = 1$	

†Peak σ in mb/sterad c.m.

J. B. Reynolds, K. G. Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

$Li^{7}_{3\ 4}$ Level $Be^9(d,\alpha)$ $E_d = 0.45$
$Li^6(d,p)$ $E_d = 0.50$
(0.478) $\tau = 5.3 \times 10^{-14}$ s 6
From Doppler shift. Stopping power measured.

D. S. P. Bunbury, S. Devons, G. Manning, J. H. Towle, Proc. Phys. Soc. 69A, 165 (1956).

Levels $Be^9(d,\alpha)$ $E_d = 0.50$, 0.70
4.62 s; 70°
No evidence of 5.5 level

R. W. Gelinas, S. S. Hanna, Phys. Rev. 100, 1253A (1955).

Levels $Li^{(6)}(d,p)$ $E_d = 3.7$ to 4.7

4.454	~20	s
6.530	~20	

Based on g.s. Q = 5.020

L. M. Khromchenko, V. A. Blinov, Soviet Phys. JETP 1, 596 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 741 (1955).

Levels $Be^9(d,\alpha)$ $E_d = 3.5$

4.6	8000 tracks of mag-
6.6	netically separated

No evidence of 5.5 level t's studied in ppl

J. J. Jung, P. Cüer, J. phys. radium 17, 555 (1956).

Level $Li^6(n,n)$ $E_n = 0.21$ to 0.40
(7.46) $J = 5/2^-$ n,n(θ)

H. B. Willard, J. K. Bair, J. D. Kington, H. O. Cohn, Phys. Rev. 101, 765 (1956).

$Li^{7}_{3\ 4}$ $He^{(4)}(t,t)$ $E_t = 1.2$ to 2.2
Table of $\sigma(\theta, E_t)$ given

A. Hemmendinger, Bull. Am. Phys. Soc. 1, No. 2, 96, N7 (1956).

$Li^6(n,\alpha)$ $E_n = 0.88$ to 14.1
$\sigma(E_n) \propto 1/E_n$ beyond hump at $E_n \sim 2$. Hump attributed to competing reactions rather than level.

F. L. Ribe, Phys. Rev. 741 (1956).

$Li^{8}_{3\ 5\ 0.84^8}$ $B^{(11)}$(12 to 20-Mev n,α)$Li^8 \xrightarrow{\beta} Be^8 \rightarrow 2\alpha$; ppl
No evidence found for β decay to Be^8 levels above 2.9

A. H. Armstrong, G. M. Frye, Jr., Phys. Rev. 103, 335 (1956).

$Li^{8}_{3\ 5}$ Levels $Li^{(7)}(d,p)$ $E_d = 3.7$ to 4.7

g.s.	Q = -0.183 20	s
0.977 20		

L. M. Khromchenko, V. A. Blinov, Soviet Phys. JETP 1, 596 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 741 (1955).

Level $Li^{(7)}(n,n)$ $E_n = 0.229$ to 0.275
(2.28) $J = 3^+$ n,n(θ)
Background s-wave channel spin 2 predominant

R. G. Thomas, M. Walt, R. B. Walton, R. C. Allen, Phys. Rev. 101, 759 (1956).

Level $Li^7(n,n)$ $E_n = 0.20$ to 0.60
(2.28) $J = 3^+$ n,n(θ)
Background s-wave channel spin statistical

H. B. Willard, J. K. Bair, J. D. Kington, H. O. Cohn, Phys. Rev. 101, 765 (1956).

Polarization $Li^{(7)}(p,n)$; $Li^{(7)}(n,n)$
$E_p = 2.2, \theta_1 = 70°$; $E_n = 0.28, \theta_2 = \pm 49°, \pm 82°$
P_1P_2 (due to Li^8 2.28 level) ~0.24

H. B. Willard, J. K. Bair, H. O. Cohn, J. D. Kington, Bull. Am. Phys. Soc. 1, No. 1, 54 R1 (1956).

$Be^{7}_{4\ 3\ 54^d}$ τ 53.0^d 4 $C^{(12)}$(160-Mev p) chem
$[\lambda(Be) - \lambda(BeF_2)]/\lambda = 0.0012$ 1 differential ic

R. Bouchez, J. Tobailem, J. Robert, R. Muxart, R. Mellet, P. Daudel, R. Daudel, J. phys. radium 17, 363 (1956).

$Be^{7}_{4\ 3}$ Levels $Li^{(7)}(p,n)$ $E_p = 2.6$ to 2.9

100+	g.s.	He^3(n,p) detector
~4+ to 10+	(0.43)	at several angles

p,n(θ) ~ isotropic for both n groups
σ(0.43 level)/σ(g.s.) increases with E_p

R. Batchelor, G. C. Morrison, Proc. Phys. Soc. 68A, 1081, 452 (1955).

$Be^{7}_{4\ 3}$

Level $Li^{(7)}(p,n)$ $E_p = 1.8$ to 4.5; VdG,
0.434 *4* thresh n, ~0°
$\sigma(0.434\ \text{level})/\sigma(\text{g.s.}) = 0.0018$ *6* for $E_p = 2.40$

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 91 (1955).

Level $B^{10}(p,\alpha)$ $E_p = 1.45$
(0.43) $\tau = 1.9 \times 10^{-13}$ s *7*
From Doppler shift. Stopping power estimated.

D.S.P.Bunbury, S.Devons, G.Manning, J.H.Towle, Proc. Phys. Soc. 69A, 165 (1956).

Capture γ's $Li^{6}(p,\gamma)$ $E_p = 0.4$ to 1
38† ~5.8 Q = 5.66 *3* scin
62† ~6.2
†Intensity ratio not f(E or θ). $W(\theta) = 1 + \cos^2\theta$

J.B.Warren, T.K.Alexander, G.B.Chedwick, Phys. Rev. 101, 242 (1956).

$Be^{8}_{4\ 4}$

Level $Be^{9}(p,d)$ $E_p = 16.5$
11† g.s. $l_n = 1$ (2?) p,d(θ)
†$\sigma(23°)$ in mb/sterad c.m.
Stripping theory fit requires R = 3 while at $E_p = 5$, R = 6 is needed. Cf. He^{4}, Chagnon.

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Level $Be^{9}(p,d)$ $E_p = 31.3$
g.s. $l_n = 1$? p,d(θ)
Poor stripping-theory fit (R = 4)

J.Benveniste, R.G.Finke, E.A.Martinelli, Phys. Rev. 101, 655 (1956).

Levels $Be^{9}(d,t)$ $E_d = 3.5$, 30°
g.s. 8000 tracks of mag-
2.2? netically separated
2.9 t's studied in ppl

J.J.Jung, P.Cüer, J. phys. radium 17, 555 (1956).

Levels $B^{(10)}(d,\alpha)$ $E_d = 5$
g.s. S 50°, 90°
2.9
No other levels found between 0 and 9 Mev

C.Bockelman, A.Lévêque, J. phys. radium 17, 557 (1956).

$Be^{9}(d,t)$ $E_d = 0.47$ to 1.15
No evidence of level 4.0 to 4.3 s; 23° to 90°

R.W.Gelinas, S.S.Hanna, Phys. Rev. 100, 1253A (1955).

$Be^{8}_{4\ 4}$

Levels $Li^{7}(p,\gamma)Be^{8} \rightarrow 2\alpha$ $E_p = 0.44$
(2.9) s, ppl 70°, 90°
~10 very broad
No α groups corresponding to Be^{8} levels at 4.1, 5.3, 7.5 (<1.0, 0.5, 0.5% of total α's)

E.C.LaVier, S.S.Hanna, R.W.Gelinas, Phys. Rev. 103, 143 (1956); 100, 1252A (1955).

Levels $Li^{6}(He^{3},p)$ $E_{He^3} = 1.25$
g.s. 45°, 90°, 135°
100† 2.9 absorbers + scin
5.6† 12.3 $\Gamma \sim 2$
No evidence for levels at 4.05, 4.9, 5.3, 7.5 (<1† if sharp, <3† if broad)

C.D.Moak, W.R.Wisseman, Phys. Rev. 101, 1326 (1956).

Levels $C^{(12)}(\gamma,\alpha)$ $E_\gamma = 17.6$; ppl
3.2 455 stars
4.0
7.5 broad
9.0

H.Glättli, E.Loepfe, P.Stoll, Helv. Phys. Acta 28, 366A (1955).

Levels $C^{(12)}(\gamma,\alpha)$ 2500 stars; ppl $E_\gamma \leq 40$

Level		Γ	J
g.s.		0.03	0
2.95	*10*	0.70 *15*	2
4.0	*1* ?	<0.3	2,4
6	?	<1.0	0,2,4
10	?	<1.0	0,2,4
15	?	<1.0	0,2,4
16.4	*2* ?	<0.4	0,2
16.8	*2*	<0.3	2
17.6	*2*	<0.3	2(0?)

? Not only possible interpretation of data $\gamma,\alpha(\theta)$ for g.s., 2.9, 16.8, 17.6 levels. See C^{12}.

F.K.Goward, J.J.Wilkins, Proc. Roy. Soc. 228, 376 (1955).

Levels $C^{(12)}(\gamma,\alpha)$ $E_\gamma \leq 27, \leq 33$
Distribution of Be^{8} excitation energies calculated from 485 stars shows maxima at ~ 2.5, ~ 10.5, ~ 13.5, ~ 16.5 ($\Sigma E_\alpha > 12.5$)
~ 2.5, ~ 9 ($\Sigma E_\alpha < 12.5$)

F.I.Havlíček, B.Dobovišek, Phys. Rev. 100, 1355 (1955).

Levels $Li^{7}(d,n)$ $E_d = 0.92$ ppl
Energy distribution of 1200 tracks shows maxima corresponding to Be^{8} levels at g.s., 3.0, 4.1, 4.8, 5.8, 7.5, 9.6
n group to g.s. has experimental width of 0.43

J.R.Bird, R.H.Spear, Australian J. Phys. 8, 567 (1955).

$Be^{8}_{4\ 4}$

Level $B^{(11)}(p,\alpha_i)Be^{8} \rightarrow 2\alpha_j$ $E_p = 0.163$
(2.9) $J = 2$ $\alpha_i\alpha_j(\theta)$

E. H. Geer, E. B. Nelson, E. A. Wolicki, Phys. Rev. 100, 215; 98, 241A (1955).

Level $Li^{7}(p,\gamma)Be^{8} \rightarrow 2\alpha$ $E_p = 0.45$
(2.9) $J = 2^{+}$ scin $\gamma\alpha(\theta)$
$[\gamma\alpha(120°)]/[\gamma\alpha(180°)] \sim 1.2$

A. J. P. Boyle, Nuclear Phys. 1, 581 (1956).

Levels $Be^{9}(p,d)$ $E_p = 95$
g.s. and 2.9 p,d(θ)
~17
p,d(θ) for $E_p = 5$ to 95 accounted for by transparent nucleus, Born approximation, and pick-up theory

W. Selove, Phys. Rev. 101, 231 (1956); S. Glashow, W. Selove, Phys. Rev. 102, 200 (1956).

Levels $Li^{(7)}(p,\gamma)$ $E_p = 0.40, 0.47, 0.54$
No levels between 7 and 15 Mev excited
(<3% of g.s.) pc for γ's, 90°

A. C. Riviere, P. B. Treacy, Australian J. Phys. 8, 408 (1955).

Level $Li^{(7)}(p,\gamma)$ p res. calibration
17.628 $E_o = 0.4412$ *6* ST

P. Bumiller, H. H. Staub, H. E. Weaver, Helv. Phys. Acta, 29, 83 (1956); 28, 355A (1955).

γ $Li^{(7)}(p,\gamma)$ $E_p = 0.20$ to 0.44
17.6γ/14.8γ increases with E_p by factor of 3.4 in above E_p range scin

J. G. Campbell, Australian J. Phys. 9, 156 (1956).

Levels $Li^{7}(p,p)$ $E_p = 1.3$ to 3.0
At 6 angles from 70° to 167°, σ shows max at 2.000, dip at 2.230, anomaly near 1.882

P. R. Malmberg, Phys. Rev. 101, 114 (1956); 98, 1167A (1955).

Resonances $Li^{(7)}(p,n)$ long counter, 0°
Peaks found at $E_p = 2.30$, 3.2?

J. B. Marion, T. W. Bonner, C. P. Cook, Phys. Rev. 100, 91 (1955).

$Be^{9}_{4\ 5}$

ground state	
J	3/2
$\lvert\mu\rvert$	1.1774 2

I

L. C. Brown, D. Williams, J. Chem. Phys. 24, 751 (1956).

$Be^{9}_{4\ 5}$

Level $Be^{9}(p,d)$ $E_p = 31.3$
g.s. $l_n = 1$? p,d(θ)
See Be^{8}, Reynolds, Standing; Benveniste et al.

Levels $Be^{9}(p,p')$ $E_p = 4.6$ to 5.3
23† g.s. s
1† 1.675 2 ?*
~4† 2.432 4 $\Gamma \leq 0.001$ implies $J \geq 5/2$
†$\sigma(170°)$ in mb/sterad
*Attributable to level or 3-body break-up

C. R. Gossett, G. C. Phillips, J. P. Schiffer, P. M. Windham, Phys. Rev. 100, 203 (1955).

Levels $Be^{9}(\alpha,\alpha')$ $E_\alpha = 21.6$
$Be^{9}(d,d')$ $E_d = 10.8$
1.74 *10* ?* s; several
(2.428) angles
3.01 *10*
*Attributable to level or 3-body break-up

D. W. Miller, V. K. Rasmussen, M. B. Sampson, U. C. Gupta, Phys. Rev. 100, 851, 1253A (1955).

Levels $Be^{9}(\alpha,\alpha')$ $E_\alpha = 44$; a pc
g.s. 13°, 70°, 114°
< 1† 1.8
10† 2.4 *1* 13°, 70°, 114°
5† 3.1 ? 70°
$\alpha,\alpha'(\theta)$ suggests collective excitation
Levels at 4.8, 6.8 not seen
†Relative intensity at 70°

G. W. Farwell, D. D. Kerlee, Bull. Am. Phys. Soc. 1, No. 1, 20, DA5 (1956); verbal report.

Levels $Be^{9}(p,p')$ $E_p = 31.3$; $p,p'(\theta)$

Level	l*	Level	l*
g.s.	1, (2?)	7.94 *8*	3
2.46 *5*	1(2?)	11.3 *2*	
5.0 *3*		19.9 *1*	0
6.76 *6*	1**	21.7 *1*	0 or 1

*l of Austern, Butler, McManus theory
**If level is double, $l = 1$ for 6.2, 2 for 6.8
3 pc differential range spectrometer

J. Benveniste, R. G. Finke, E. A. Martinelli, Phys. Rev. 101, 655 (1956).

Levels $Be^{9}(p,p')$ $E_p = 12$
$Be^{9}(d,d')$ $E_d = 24$
$Be^{9}(\alpha,\alpha')$ $E_\alpha = 48$
~1† 1.8 ?
100† 2.43 $l_x = 1$ $xx'(\theta)$

R. G. Summers-Gill, Phys. Rev. 100, 1795A (1955).

Level $Be^{9}(p,p')$ $E_p = 10$
(2.43) $l_p = 0$ $p,p'(\theta)$

S. W. Rasmussen, Phys. Rev. 103, 186 (1956).

$Be^{9}_{4\ 5}$

Level $Be^{9}(d,d')$ $E_d = 9$; s 25°
$d,d'(\theta)$ for 2.43 level lacks forward peak
No 1.8, 3.2, 4.9 levels

T.S.Green, R.Middleton, Proc. Phys. Soc. 69A, 28 (1956).

Level $Be^{9}(n,n')$ $E_n = 3.7$
(2.43) decays to Be^{8} + n scin

J.M.Fowler, S.S.Hanna, G.E.Owen, Phys. Rev. 98, 249A (1955).

$Be^{9}(n,n'\gamma)$ $E_n = 2.56, 2.74$
No γ's observed [$\sigma(95°) < 0.03$ mb/sterad] scin

R.B.Day, Phys. Rev. 102, 767 (1956).

Levels $B^{(11)}(d,\alpha)$ $E_d = 7$
$Be^{9}(p,p')$ $E_p = 7$
2.43 s
3.04 $\Gamma \geq 0.28$

C.K.Bockelman, A.Lévêque, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 6, 280 B1 (1956).

$Be^{10}_{4\ 6}$ 2.5×10^{6}y

Yield in $U^{235}(n,f) \leq 4 \times 10^{-4}$%

K.F.Flynn, L.E.Glendenin, E.P.Steinberg, Phys Rev. 101, 1492 (1956).

$Be^{10}_{4\ 6}$

Levels $Be^{9}(d,p)$ $E_d = 9$
s; $d,p(\theta)$

Level	l_n
g.s.	1
(3.37)	1
(5.96)	0
(6.26)	0
(7.37)	1

T.S.Green, R.Middleton, Proc. Phys. Soc. 69A, 28 (1956).

Level $Be^{9}(n,n)$ $E_n = 0.53$ to 0.9
$\Gamma = 0.008$ (7.37) $J = 2^+$ or 3^+ $\sigma(E,\theta)$

R.O.Lane, J.E.Monahan, Bull. Am. Phys. Soc. 1, No. 4, 187 K1 (1956); verbal report.

$B^{9}_{5\ 4}$

Level $B^{(10)}(d,t)$ $E_d = 7$
g.s. $Q = -2.187$ *10* s

C.K.Bockelman, A.Lévêque, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 6, 280 B1 (1956).

Levels $B^{10}(p,d)$ $E_p = 18.9$
g.s. $l_n = 1$
2.41 *15* $l_n = 1$
$p,d(\theta)$

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

$B^{9}_{5\ 4}$

Levels $Be^{9}(p,n)$ $E_p = 2.0$ to 5.5; VdG
1.4* ? $\Gamma \sim 1$ thresh n, ~0°
2.327 *5* $Q = -4.178$ *5*
*Also attributable to 3-body break-up
$\sigma(E_p = 2.52) = 11$ mb/sterad

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 91 (1955).

$B^{10}_{5\ 5}$

Level $B^{11}(p,d)$ $E_p = 18.9$
g.s. $l_n = 1$ $p,d(\theta)$

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Levels $Li^{7}(\alpha,n)$ $E_\alpha \sim 8$
g.s. $Q = -2.82$ *10*
0.74 *6* p recoil,
1.31 *6* thresh n; ~0°
1.72 *6*

A.B.Robbins, Phys. Rev. 101, 1373 (1956); 100, 1549A (1955).

Level $B^{10}(n,n'\gamma)$ $E_n = 2.56$; scin
γ 0.717 *7* $\sigma(95°) = 2.5$ *3* mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Level $Be^{9}(d,n)$ time of flight
(0.72) $\tau = 790^{\mu\mu s}$ *200*

J.C.Severiens, S.S.Hanna, Phys. Rev. 100, 1254A (1955); verbal report.

Levels $Be^{9}(p,n)$ $E_p = 2.0$ to 5.5
8.89 *2* long counter,
10.80 *3* broad ~0°
w 11.03 *3*

J.B.Marion, T.W.Bonner, C.F.Cook, Phys. Rev. 100, 91 (1955).

Levels $Be^{9}(p,n)$ $E_p = 2$ to 5, 0°, 90°
long counter

$\int\sigma d\theta$	Level	Γ	
0.101	8.891 *6*	0.085 *10*	
	9.5	0.7	} p,n(θ) at
	10.8		} five E_p's

$Be^{9}(p,\alpha+3.6\gamma)$ $E_p = 2.0$ to 2.9
8.891 *4* 0.038 *3* scin, 90°

Suggests 8.89 level is double; J = 3, T = 1 level involved in (p,n); J = 2, T = 1 in $(p,\alpha+3.6\gamma)$

J.B.Marion, Phys. Rev. 103, 713 (1956).

$B^{11}_{5\ 6}$

Levels $Be^{9}(He^{3},p_0)$ $E_{He^3} = 2$; ppl
Graphs of $He^3,p_0(\theta)$; $He^3,p_1(\theta)$; $He^3,p_2(\theta)$; $He^3,p_3(\theta)$ show no symmetry about 90°

H.D.Holmgren, W.E.Kunz, M.L.Bullock, Phys. Rev. 100, 436, 1253A (1955).

$B^{11}_{5\ 6}$

Level $B^{10}(d,p+2.14\gamma)$ $E_d = 1.20$
(2.14) $J = 1/2$ $p\gamma(\theta)$
$p(2.14\gamma)(\theta)$ is isotropic ($\pm 3.5\%$)

S. Gorodetzky, A. Gallmann, M. Croissiaux, R. Armbruster, Compt. rend. 242, 2545 (1956); J. phys. radium 17, 550 (1956).

Level $B^{11}(p,p'\gamma)$ $E_p = 2.0$ to 5.3
(2.14) $J = 1/2(\overline{3/2}?)$ $p,\gamma(\theta)$

J. K. Bair, J. D. Kington, H. B. Willard, Phys. Rev. 100, 21 (1956).

Levels $Li^{(7)}(\alpha,n)$ $E_\alpha = 4.1$ to 5.8
2.5* 11.69 thresh n, $\sim 0°$
3.4* 11.95 $\Gamma = 0.24$
*$\sigma(0°)$ in mb/sterad

H. Bichsel, T. W. Bonner, Bull. Am. Phys. Soc. 1, No. 2, 93, M5 (1956).

Levels* $Be^9(d,d)$ $E_d = 1.02$ to 1.44
16.769 $\Gamma \sim 0.07$ 90° to 160°
17.021 $\Gamma \sim 0.12$ ppl
*Increases in σ_{el}/σ(Rutherford) found

M. K. Jurić, S. D. Cirilov, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 45 (1956).

Reactions observed $E_n = 12$ to 20; ppl
$B^{10}(n,\alpha)Li^7$(4.61 level) $\longrightarrow \alpha + t$
$B^{10}(n,d)Be^9$(2.43 level) $\longrightarrow n + Be^8$(g.s. and 2.9 levels $\longrightarrow 2\alpha$
$B^{10}(n,\alpha)Li^7$(10.8 and 12.4 levels) $\longrightarrow n +$ Li^6(2.19 level) $\longrightarrow d + \alpha$

Reactions not observed
$B^{10}(n,t)Be^8$(g.s. or 2.9 level) $\longrightarrow 2\alpha$
$B^{10}(n,n')B^{10} \longrightarrow d + 2\alpha$

$\sigma(n,t\ 2\alpha)$ and $\sigma(n,d\ n'\ 2\alpha)$ given as $f(E_n)$

G. M. Frye, Jr., J. H. Gammel, Phys. Rev. 103, 328 (1956).

$B^{12}_{5\ 7}$ 0.03^8

β^- 17† (8.94) pc, scin $\beta\gamma$
1000† (13.37)
No γ with $3.3 < E_\gamma < 4.5$ ($< 4 \pm 20$†)
Li^8 comparison $B^{(11)}(d,p)$, pulsed beam

N. W. Tanner, Phil. Mag. 1, 47 (1956).

$\beta(4.4\gamma)/\beta = 0.013\ 4$ scin
$\beta(3.2\gamma)/\beta \leq 0.002$ $\beta(7.6\gamma)/\beta \leq 0.002$
Conclude J = 1 for B^{12} g.s.

C. A. Barnes, R. W. Kavanagh, Phys. Rev. 100, 1796A (1955).

α $\sim 1\%$ 0.195 $B^{11}(d,p)$; s
Presumably from C^{12} 7.65 level to Be^8 g.s.

W. A. Fowler, C. W. Cook, C. C. Lauritsen, T. Lauritsen, F. Mozer, Bull. Am. Phys. Soc. 1, No. 4, 191 M2 (1956).

$B^{12}_{5\ 7}$

Level $Be^9(\alpha,p)$ $E_\alpha = 21.6$
3.38 s
p's to this level previously interpreted as d's

V. K. Rasmussen, D. W. Miller, M. B. Sampson, U. C. Gupta, Phys. Rev. 100, 851 (1955); *W. O. McMinn et al., Phys. Rev. 84, 963 (1951).

$B^{13}_{5\ 8}$

Level $Li^7(Li^7,p)$ $E_{Li^7} = 1.61$
g.s. $Q = 5.97\ 3$ scin 90°

S. K. Allison, P. G. Murphy, E. Norbeck, Jr., Phys. Rev. 102, 1182 (1956).

$C^9_{6\ 3}$

$C^9 \rightarrow \beta^+ + \nu + p + \alpha + \alpha + Q$, $Q > 15.4$ from tracks found in ppl exposed to 3-Bev p's.
$8408.6 < \text{Mass } C^9 < 8409.6$ Mev

M. S. Swami, J. Schneps, W. F. Fry, Phys. Rev. 103, 1134 (1956).

$C^{11}_{6\ 5}$

Level $B^{(11)}(p,n)$ $E_p = 7.03$
25† g.s. $Q = -2.83\ 8$ 4 angles
10† 2.01 6 ppl
$\sigma(0°)/\sigma(20°) \sim 2.5$ for both levels
g.s. $\sigma(0°) = 13^{+13}_{-7}$ mb/sterad. †At all 4 angles

F. Ajzenberg-Selove, G. D. Johnson, A. Rubin, M. Mazari, Phys. Rev. 103, 356 (1956).

Levels $C^{(12)}(p,d)$ $E_p = 95$
st g.s.
~4.5

W. Selove, Phys. Rev. 101, 231 (1956).

Levels $B^{10}(p,\gamma)$ $E_p = 0.5$ to 2.0
σ Level scin
g.s. $Q = 8.81\ 10$
3.5 10 μb 9.729 15 $\Gamma = 0.54\ 4$
$p,(9.73\gamma)(\theta) = 1 + (0.50\ 5)\cos^2\theta$

$B^{10}(p,\alpha+0.43\gamma)$ $E_p = 0.6$ to 2.0
0.21 5 b 10.09 scin
$p,(0.43\gamma)(\theta) \sim$ isotropic ($\pm 2\%$)

G. B. Chadwick, T. K. Alexander, J. B. Warren, Can. J. Phys. 34, 381 (1956).

Levels $B^{10}(d,n)$ $E_d = 0.35$ to 4.5; VdG
0.18† 8.107 8 thresh n, $\sim 0°$
1.0† 8.430 8
1.6† 8.660 8
No n thresholds observed corresponding to levels at 6.87, 7.39, 8.97, 9.13, 9.70, 10.06
Graph of $\sigma(\sim 0°)$ given for n yield
†Relative intensities at thresholds, 0°

J. B. Marion, T. W. Bonner, C. F. Cook, Phys. Rev. 100, 847 (1955).

$C^{11}_{6\ 5}$ Levels $B^{10}(p,\alpha)$ $E_p = 0.8$ to 1.8

Level	J	Γ	
•			sd, 46°
9.7	$5/2^+$	>0.30	
10.1	$5/2^-$	~0.20	
background	$3/2^-$		

H.R. Allen, N. Govindjee, N. Sarma, Proc. Phys. Soc. 69A, 350 (1956).

Levels $B^{10}(p,\alpha)$ $E_p = 0.8$ to 1.8

σ_{α_0}	σ_{α_1}	Level	J	Γ	
					EA
0.21 4		9.7	$3/2^-$	0.30	$p,\alpha(\theta)$
0.23 4	~0.13	10.1	$7/2^+$	0.25	

J.W. Cronin, Phys. Rev. 101, 298 (1956); Bull. Am. Phys. Soc. 1, No. 1, 20 DA7 (1956).

$C^{12}_{6\ 6}$ Levels $C^{(12)}(p,p')$ $E_p = 96$

100†	g.s.	scin $p,p'(\theta)$
~5†	4.4	
	9.6	
	20.8 7	

Inelastic peak energies are constant in c.m. system ∴ final states involve whole nucleus

K. Strauch, F. Titus, Phys. Rev. 103, 200 (1956); 95, 854 (1954).

Levels $C^{(12)}(\alpha,\alpha')$ $E_\alpha = 22$

g.s.		s
(4.43)		
7.64 7	$\Gamma_\alpha/\Gamma > 0.8^*$	
(9.6)		
(12.7) ?		

*From absence of C recoils

$\alpha,\alpha'(\theta)$ not symmetric about 90° c.m.

V.K. Rasmussen, D.W. Miller, M.B. Sampson, Phys. Rev. 100, 181 (1955).

Levels $B^{10}(\alpha,d)$ EA

g.s. Q = 1.3405 10

$N^{(14)}(d,\alpha)$ EA

(9.64) Q = 3.928 11 Γ ~ 0.035

R. Chiba, R.A. Douglas, J.W. Broer, D.F. Herring, E.A. Silverstein, Phys. Rev. 100, 1253A (1955); verbal report.

Level $C^{(12)}(n,n'\gamma)$ $E_n = 6.58$; scin

γ 4.42 3 $\sigma(95°) = 28$ 5 mb/sterad

R.B. Day, Phys. Rev. 102, 767 (1956).

Level $Be^9(\alpha,n)$ $E_\alpha = 2$

(4.43) $\tau = 1.8 \times 10^{-14}$s 6

From Doppler shift. Stopping power estimated.

S. Devons, G. Manning, J.H. Towle, Proc. Phys. Soc. 69A, 173 (1956).

$C^{12}_{6\ 6}$ Level $C^{(12)}(d,d')$ $E_d = 9$; s

$d,d'(\theta)$ for 4.43 level lacks forward peak

T.S. Green, R. Middleton, Proc. Phys. Soc. 69A, 28 (1956).

$Be^9(\alpha,n\gamma)$ $E_\alpha = 5.30$

$n\gamma(\theta)$ isotropic (4.43 γ predominates)

$\eta = 0.000\ 65$

K.G. Steffen, O. Hinrichs, H. Neuert, Z. Physik 145, 156 (1956).

Levels $Be^9(\alpha,n\gamma)$ $E_\alpha \leq 4.3$

3mb*	4.48 6	s1 pr
(7.6)	$\Gamma_\alpha/\Gamma > 0.96$**	

**From absence of prs from 7.6 level to g.s. and 4.5 level (<5% of prs from 4.5 level)

*Average σ for $E_\alpha = 0$ to 4.3

R.D. Bent, T.W. Bonner, J.H. McCrary, W.A. Ranken, Phys. Rev. 100, 771 (1955).

Levels $B^{10}(He^3,p)$ $E_{He^3} = 1.25$

400†	(4.43)	scin
10†	(7.6)	

No level between 4.43 and 7.6 (<1†)

C.D. Moak, A. Galonsky, Bull. Am. Phys. Soc. 1, No. 4, 196 N8 (1956); verbal report.

Levels $Be^9(\alpha,n)$ $E_\alpha = 1.25$

(4.43)	4.43γ is E2	scin, $e^+e^-(\theta)$
	$B^{(11)}(p,\gamma)$	$E_p = 0.680, 1.390$
(16.57)	12.14γ is E1	scin,
(17.22)	17.22γ is E1	$e^+,e^-(\theta)$

S. Gorodetzky, R. Armbruster, P. Chevallier, A. Gallmann, Compt. rend. 242, 898 (1956); J. phys. radium. 17, 548 (1956).

Level $Be^9(\alpha,n)$ $E_\alpha = 5.3$

(7.6)

No prs observed from 7.6 level (< 0.3% of prs from 4.4 level)

G. Goldring, R. Wiener, Y. Wolfson, Bull. Research Council Israel 5A, 87A (1955).

Level $N^{14}(d,\alpha)$ $E_d = 0.855$; sd 61°,

7.658 27 Q = 5.912 13 135°

Assumed g.s. Q = 13.570 24

K. Ahnlund, Arkiv Fysik 10, 369 (1956).

Level $N^{14}(d,\alpha)$ $E_d = 0.855$

7.660 28 Q = 5.910 15 sd

Assumed g.s. Q = 13.570 24

R.T. Pauli, Arkiv Fysik 9, 571 (1955).

$C^{12}_{6\ 6}$ Levels $B^{11}(d,n)$ $E_d = 1.0$ ppl 0°,90°

12.0 *1*
12.9 *1*
13.6 *1*
13.9 *1*

12.9 level not observed at 90°

E. Kondaiah, Proc. Indian Acad. Sci. 43A, 130 (1956).

$C^{(12)}(\gamma,3\alpha)$ $E_\gamma \leq 40$; ppl $\gamma,\alpha(\theta)$

E_γ		Be^8 levels*
13.0 to 15.6	E2	g.s. 2500 stars
	E2, M1	2.9
15.6 to 25	E1, E2	2.9, 4.0, g.s., 6 and 10, 15
>25	E1	16.8, 17.6, 6 and 10 2.9 and 4, 15, g.s.

*In order of observed frequency. See Be^8

Level 21.9 $J = 2\dagger$ $T = 0$
Only level of previous work to which spin could be assigned

P.K. Goward, J.J. Wilkins, Proc. Roy. Soc. 228, 376 (1955).

Level $C^{(12)}(\gamma,\gamma)$
15.0 *2* $\Gamma \sim 100$ ev $\Gamma_\gamma/\Gamma > 0.5$

E.G. Fuller, E. Hayward, N. Svartesson, Bull. Am. Phys. Soc. 1, No. 1, 21, DA8 (1956); Verbal report.

Level $B^{(11)}(d,n)$ $E_d = 1.0$ to 5.5; VdG
15.100 *6* thresh n, ~0°
Graph of $\sigma(\sim 0°)$ given for n yield

J.B. Marion, T.W. Bonner, C.P. Cook, Phys. Rev. 100, 847 (1955).

Level $B^{(11)}(d,n\gamma)$ $E_d = 1.6$ to 3.3
15.106* *3* No α observed; scin
*From threshold for $\sim 15\gamma = 1.633$ *3*
12.8 γ observed at $E_d = 1.63$**

C.A. Barnes, R.W. Kavanagh, Phys. Rev. 100, 1796A (1955); **verbal report.

Levels $B^{(11)}(p,\alpha_i)2\alpha_j$ $E_p = 0.163, 0.290$
(16.10) $J = 2$ $\alpha_i\alpha_j(\theta)$
(16.57) $J \neq 2^-, 3^+$*, $J = 2^+$*
(17.22) $J \neq 1^-$*
*Assuming single level is responsible for $\alpha_i\alpha_j(\theta)$ for $E_p = 0.290$. Results also explainable by mixture, 16.57 (2^-), 17.22 (1^-)

E.H. Geer, E.B. Nelson, E.A. Wolicki, Phys. Rev. 100, 215; 98, 241A (1955).

$C^{12}_{6\ 6}$ Level $B^{(11)}(p,p)$ $E_p = 0.6$ to 2.0
(16.57) $J = 2^-$ sπ 152°
Spin assignment is consistent with σ measurement if there is no overlapping with 17.22 level

G.W. Tautfest, S. Rubin, Phys. Rev. 103, 196 (1956).

Levels $B^{11}(p,\gamma_o \text{ or } \gamma_1)$ $E_p = 2.0$ to 5.3
$B^{11}(p,n)$ VdG 0°,90°
$B^{11}(p,p'\gamma_j)$ scin, long counter

Γ	Level	n	γ_o	γ_1	γ_j
0.3	18.3	--	st	w	--
0.046	18.39	--	--	--	st
0.1	18.84	st	st	w	st
0.5	19.2	st	st	st	st
0.05	19.41	--	--	--	st
0.2	19.66	st	--	--	--
0.1	19.87	--	w	--	st
0.2	20.25	st	--	--	st
0.2	20.48	--	st	--	--
0.2	20.64	--	st	--	st

J.K. Bair, J.D. Kington, H.B. Willard, Phys. Rev. 100, 21 (1955).

Levels* $C^{(12)}(\gamma,n)20^{m}C^{11}$ $E_\gamma \leq 20$
19.10 *5*
19.55 *5*
*Sharp peaks in activation curve

B.N. Spicer, A.S. Penfold, Phys. Rev. 100, 1375 (1956).

Levels $C^{(12)}(\gamma,3\alpha)$ $E_\gamma \leq 27, \leq 33$
Distribution of C^{12} excitation energies calc. from 485 stars. Levels not clearly resolved.

F.I. Havliček, B. Doboviček, Phys. Rev. 100, 1355 (1955).

$C^{13}_{6\ 7}$ Level $C^{(12)}(d,p)$ $E_d = 2.68, 3.26$
19,13† g.s.
†σ(peak) for above E_d respectively. σ's for C^{13}, N^{13} show g.s. reduced widths ~ same.

R.E. Beneson, K.W. Jones, M.T. McEllistrem, Phys. Rev. 101, 308 (1956).

Level $C^{(12)}(d,p)$ $E_d = 0.262$ to 0.585
g.s. ppl
Values given of $a_1 - a_4$ in $\Sigma a_i P_i(\theta)$ for d,p(θ)
$\int \sigma d\theta$ increases with E_d from 0.6 to 9.9 mb
Values differ slightly from those of Valckx* obtained with scin

B. Koudijs, Thesis, University of Utrecht (1956); *P.P.G. Valckx, Thesis, University of Utrecht (1956).

$C^{13}_{6\ 7}$

Level $C^{(12)}(d,p)$ $E_d = 0.60$ to 1.45
g.s. ppl
Values given of $a_0 \cdots a_5$ in $\Sigma a_i P_i(\theta)$ for $d,p(\theta)$

M.K.Jurić, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 35 (1956).

Level $C^{(12)}(d,p)$ $E_d = 1.43$ to 1.95
g.s. ppl
Graphs of $d,p(\theta)$ given

F.Alba, T.A.Brody, A.Fernández, M.Mazari, V. Serment, M.Vasquez, Anales Inst. Fisica Mexico 1, 1 (1955); Rev. Mexicana Fiz 4, 207 (1955).

Levels $C^{(12)}(d,p)$ $E_d = 8.9$

Level	l_n	θ^2	$d,p(\theta)$
g.s.	1	0.07	
(3.09)	0	0.21	
(3.68)	1	0.02	
(3.86)	2	0.14	

F.A.El Bedewi, Proc. Phys. Soc. 69A, 221 (1956).

Levels $C^{(12)}(d,p)$ $E_d = 9$

θ^2	Level	l_n	s; $d,p(\theta)$
0.05	g.s.	1	
0.27	3.090	0	
0.016	3.684	1	
0.06	3.855	2	

T.S.Green, R.Middleton, Proc. Phys. Soc. 69A, 28 (1956).

γ $B^{(10)}(\alpha,p\gamma)$ $E_\alpha = 2.3$
$C^{(12)}(d,p\gamma)$ $E_d = 2.4$

0.1695	4	$\alpha = 0.00014$*	3 sl ce, pe
3.67	3	$\tau < 0.3^{\mu\mu s}$	Doppler shift
3.844	15	$\tau < 0.3^{\mu\mu s}$	Doppler shift

No $\sim 0.6\gamma$ ($< 3\%$ of $3.67\gamma + 3.84\gamma$) sl pe
γ and p intensities show that for 3.84 level (decays to 3.67 level)/(decays to g.s.) = 0.24
*Assuming isotropy

R.J.Mackin, Jr., W.R.Mills, Jr., J.Thirion, Phys. Rev. 102, 802 (1956); J. phys. radium 17, 551 (1956); Phys. Rev. 92, 529A (1953).

Levels $B^{10}(\alpha,p)$ $E_\alpha = 8.1$

100†	g.s.	Q = 4.08 3	scin, 90°
60†	3.07 5		
600†	3.86 5		

No 0.7 level (< 7†)

G.F.Pieper, G.S.Stanford, Phys. Rev. 101, 672 (1956).

$C^{13}_{6\ 7}$

Levels $C^{12}(d,p)$ $E_d = 14.8$; s $d,p(10° < \theta < 87°)$

		l_n			
26†	g.s.	1	9.6††	7.53	2
103†	3.09	0	7.5††	7.64*	2
16†	3.68	1	100††	8.4**	3
152†	3.86	2	1.6††	9.50	2
3.6††	6.87	0,2	2.2††	9.90	2
0.8††	7.47	2	5.5††	10.76	2

$d,p(\theta)$ shows forward peak for all except 9.50 level for which distribution is isotropic
†,†† mb/sterad at † max or at †† 10°
*$\Gamma = 0.070 \pm 0.015$ **$\Gamma = 1.1 \pm 0.3$

J.N.McGruer, E.K.Warburton, R.S.Bender, Phys. Rev. 100, 235 (1955).

Level $C^{(12)}(n)$ $E_n = 0.66$ to 2.15
(6.87) $\Gamma = 0.011$ $J = 3/2$ σ_t
$n,n(\theta)$ shows d-wave involved

J.E.Wills, Jr., Bull. Am. Phys. Soc. 1, No. 4, 175 F3 (1956).

Levels $C^{(12)}(n)$ $E_n = 4.4$ to 5.5, 7.6 to 8.6

9.33		σ_t
9.52	$J > 1/2$?	σ_t

R.L.Becker, H.H.Barschall, Phys. Rev. 102, 1384 (1956); 99, 1646A (1955).

Levels $C^{(12)}(n,n'\gamma)$ $E_n = 4.4$ to 8
scin 4.4γ

10.77
10.94
11.97
12.21

H.E.Hall, T.W.Bonner, Bull. Am. Phys. Soc. 1, No. 2, 96, N10 (1956).

Levels $Be^9(\alpha,n\gamma)$ $E_\alpha = 1.5$ to 5.3
BF_3, scin γ

σ_n^*	$\sigma_{4.4\gamma}^{**}$	Level$	Γ
25	14	12.0	0.2
15		12.2	~0.2
20	4.7	12.5	~0.2
79	20	13.41	0.06
60	18	13.7	~0.4
87	23	14.1	~0.3

*mb/sterad, 0° to 20° **mb/sterad, 0° to 10°
$Not corrected for Coulomb barrier penetration

T.W.Bonner, A.A.Kraus, J.B.Marion, J.P. Schiffer, Phys. Rev. 102, 1348 (1956); Bull. Am. Phys. Soc. 1, No. 1, 20 DA3 (1956).

Levels $Be^9(\alpha,n)$ $E_\alpha = 1.7$ to 5.1

Level	n group	Γ
12.45	n_0(st), n_1(w)	
13.5	n_1(st)	small
13.5 to 13.8	n_0, n_1	large

$\alpha,n(\theta)$ shows forward peaking

J.R.Risser, C.M.Class, J.E.Price, Bull. Am. Phys. Soc. 1, No. 1, 20, DA4 (1956).

$C^{13}_{6\ 7}$

Levels $Be^9(\alpha, n_o)$ $E_\alpha = 2.5$ to 5

Level	J	
12.45		$\alpha, n(\theta)$
~13.5	$5/2^+$	
13.7	$3/2^+$	
>14	$7/2^+$	

J.R.Risser, Bull. Am. Phys. Soc. 1, No. 2, 93 M4 (1956).

Resonance peaks $C^{13}(\gamma, n)$ $E_\gamma \leq 45$

4* 14.5 $\Gamma = 4$ BF_3

9.5* 24 $\Gamma = 8$

*σ(peak) in mb

B.C.Cook, V.L.Telegdi, Bull. Am. Phys. Soc. 1, No. 1, 63, UA11 (1956); verbal report.

Levels $B^{(11)}(d, n+15.1\gamma)$ $E_d \leq 3.3$

$\sigma = 17$mb 20.51 ? Sharp decrease in slope

21.27 Weak resonance, $\Gamma \sim 0.18$

C.A.Barnes, R.W.Kavanagh, Phys. Rev. 100, 1796A (1955).

Levels $B^{11}(d, n_o)$ $E_d = 3.5$ to 5

22 to 23 J = 7/2 $d, n_o(\theta)$

J.E.Price, C.M.Class, J.R.Risser, Bull. Am. Phys. Soc. 1, No. 2, 94, M10 (1956).

$C^{14}_{6\ 8}$

Level $C^{13}(d, p)$ $E_d = 0.288$ to 0.641

g.s. $l_n = 1$ ppl

Values given of $a_1 \cdots a_4$ in $\Sigma a_i P_i(\theta)$ for $d, p(\theta)$

Stripping predominates

$\int \sigma d\theta$ increases with E_d from 0.07 to 4.1 mb

B.Koudijs, Thesis, Univ. of Utrecht (1956); B.Koudijs, F.P.G.Valckx, P.M.Endt, Physica 19, 1133 (1953). The higher (by a factor of ~5) values of $\int \sigma d\theta$ given in the thesis are due to a new analysis of the C^{13} content.

Level $C^{13}(d, p)$ $E_d = 0.6$ to 3.0

g.s. scin

Values given of $a_o \cdots a_4$ in $\Sigma a_i \cos^i(\theta)$ for $d, p(\theta)$

Compound nucleus formation predominates for $E_d < 1.7$

$\int \sigma d\theta$ increases with E_d from 7.2 4 to 26.3 13 mb, maximum at $E_d = 1.40$ 4.

J.B.Marion, G.Weber, Phys. Rev. 103, 167 (1956).

Level $C^{(13)}(d, p)$ $E_d = 8.9$

(6.09) $l_n = 0$ $d, p(\theta)$

$\theta^2 = 0.32$

F.A. El Bedewi, Proc. Phys. Soc. 69A, 221 (1956).

$C^{14}_{6\ 8}$

Levels $C^{13}(d, p)$ $E_d = 14.8$; s $d, p(10° < \theta < 87°)$

		l_n			
10†	g.s.	1	7.1††	9.80	2
62†	6.09	0	~1.9††	10.43	2
1.6†	6.59 2	0,2	1.4††	10.50	2
74†	6.72	2	90††	11.9**	3
22†	6.89	1	6.3††	12.60*	2
56†	7.35 2	2	1.0††	12.85	2
2.2††	8.32 2		1.9††	12.96	2

$d, p(\theta)$ shows forward peak for all levels

†, †† mb/sterad at † max or at †† 10°

*$\Gamma = 0.13 \pm 0.02$ **$\Gamma = 1.1 \pm 0.3$

J.N.McGruer, E.K.Warburton, R.S.Bender, Phys. Rev. 100, 235 (1955).

Levels $C^{13}(d, p\gamma)$ $E_d = 4.1$

(6.1) Elγ(assumed) sl pr

(6.7) E2γ(or E1, M1, E3)*

*From (ext 6.7 prs)/(ext 6.1 prs) = 0.51 ± 0.04

(int 6.7 prs)/(int 6.1 prs) = 0.47 ± 0.03

R.D.Bent, T.W.Bonner, J.H.McCrary, W.A. Ranken, Phys. Rev. 100, 771 (1955).

$C^{15}_{6\ 9}$ 2.4^s

τ 2.25^S C^{14}(≥1.3-Mev d,p)

β^- 80% 4.3 Compared to thick

20% 9.8 Pr^{144} source scin

$\gamma(N^{15})$ 100† 5.3

No 1.9 γ (<10†) No other γ (<5†)

R.A.Douglas, B.Gasten, J.Downey, A.Mukerji, Bull. Am. Phys. Soc. 1, No. 1, 21, DA13 (1956); verbal report; Phys. Rev. 100, 1253A (1955).

$C^{14}(d, p)2.4^s C$ $E_d = 0.6$ to 3.0

Previously reported activity for $E_d < 1.3$ ascribed to $O^{18}(d, \alpha)7.4^s N^{16}$, i.e. $Q \neq 0.15$

N.A.Bostrom, E.L.Hudspeth, I.L.Morgan, Bull. Am. No. 2, 94, M12 (1956).

$N^{13}_{7\ 6}$ 10^m

τ 10.08^m 4 $C^{(12)}$(14.1-Mev d,n)

D.H.Wilkinson, Phys. Rev. 100, 32 (1955).

Level $C^{(12)}(d, n)$ $E_d = 2.68, 3.26$

32,31† g.s.

†σ(peak) for above E_d respectively. σ's for C^{13}, N^{13} show g.s. reduced widths ~ same.

R.E.Beneson, K.W.Jones, M.T.McEllistrem, Phys. Rev. 101, 308 (1956).

Level $N^{(14)}(p, d)$ $E_p = 18.7$

~5† g.s. $l_n = 1$ $p, d(\theta)$

2.37 level not seen [$\sigma(14°$c.m.) < 0.4 mb/sterad]

†$\sigma(18°$c.m.) in mb/sterad

K.G.Standing, Phys. Rev. 101, 152 (1956).

$_{7}N^{13}_{6}$

Level $C^{(12)}(d,n)$ $E_d = 2.8$ to 3.9; VdG
2.37 2 thresh n, ~0°
Graph of $\sigma(\sim 0°)$ given for n yield

J.B. Marion, T.W. Bonner, C.P. Cook, Phys. Rev. 100, 847 (1955).

Levels $B^{10}(\alpha,n)$ $E_\alpha \sim 8$
2.4 3 p recoil,
3.6 3 thresh n; ~0°
4.3 3 ?
5.0 3
g.s. Q of 1.1 assumed

A.R. Quinton, W.T. Doyle, Phys. Rev. 101, 669 (1956).

Levels $C^{(12)}(p,p)$ $E_p = 4.0$ to 5.5

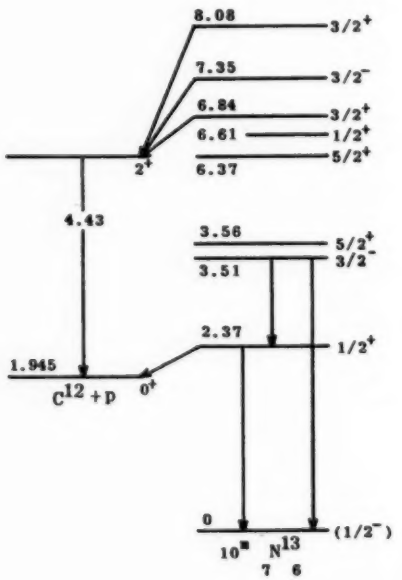
Level	J	Γ	s
6.371	$5/2^+$	0.012	p, p(θ)
6.90	$3/2^+$	0.100	

C.W. Reich, G.C. Phillips, J.L. Russell, R.R. Henry, Bull. Am. Phys. Soc. 1, No. 2, 96, N9 (1956); verbal report.

Levels $C^{(12)}(p,p)$ $E_p = 4.7$ to 7.0
$C^{(12)}(p,p' + 4.43\gamma)$ a p, p(θ)

$\sigma_{pp'}/\sigma_{pp}$	Level	J	Γ	θ^2
0.00	6.61	$1/2^+$	0.075	0.0144
0.056	6.84	$3/2^+$	0.050	0.024
0.024	7.35	$3/2^-$	0.050	0.011
0.02	8.08	$3/2^+$	0.350	0.11

p(4.43γ)(θ) is isotropic (±10%)
p, p'(θ) is isotropic ($E_p = 7$, θ = 80 to 160°)*



H. Schneider, Helv. Phys. Acta 29, 55 (1956); *J. de Boer ibid.

$_{7}N^{14}_{7}$

Levels $B^{11}(\alpha,n)$ $E_\alpha \sim 8$
g.s. Q = 0.0 3 p recoil,
2.0 3 thresh n; ~0°
3.15 30
3.85 30
4.8 3

A.R. Quinton, W.T. Doyle, Phys. Rev. 101, 669 (1956).

Level $N^{(14)}(n,n'\gamma)$ $E_n = 3.95$; scin
γ 2.30 5 σ(95°) = 0.5 3 mb/sterad

R.B. Day, Phys. Rev. 102, 767 (1956).

Level $N^{(14)}(p,p'\gamma)$ $E_p = 19$
γ (2.31) $\tau < 0.35^{\mu\mu s}$ scin
Doppler effect ΔE/E ~ 0.009 (~ maximum possible)

R. Sherr, J.B. Gerhart, H. Horie, W.F. Hornyak, Phys. Rev. 100, 945 (1955).

Level $O^{(16)}(d,\alpha)$ $E_d = 5.5$ to 7.5
2.31 s π 5 angles
Weak α group to this level established

C.P. Browne, Phys. Rev. 100, 1253A (1955); verbal report.

Levels $N^{(14)}(d,d')$ $E_d = 9$, s 40°
3.95
4.92
5.10

d, d'(θ) for 3.95 level has forward peak

T.S. Green, R. Middleton, Proc. Phys. Soc. 69A, 28 (1956).

Levels $N^{(14)}(\alpha,\alpha')$ $E_\alpha = 21.5$
3.95 4 s π several angles
5.12 7
5.79 7 7.94 7
6.47 9 8.45 7
7.01 6 10.05 7
2.31, 7.40, 7.72, 8.06, 9.49 levels not observed

D.W. Miller, B.M. Carmichael, U.C. Gupta, V.K. Rasmussen, M.B. Sampson, Phys. Rev. 101, 740 (1956).

Level $C^{13}(d,n)$ $E_d = 0.4$ to 4.2; VdG
5.683 7 $J = 1^{+*}$ thresh n, ~0°
*Slow rise suggests p-wave n's
Graph of $\sigma(\sim 0°)$ given for n yield

$C^{(12)}(d,n)$ $E_d = 2.8$ to 3.9; VdG
13.16 $J = 0^-, 1^{-**}$
**Increase of fast n's implies s-wave to g.s.
Graph of $\sigma(\sim 0°)$ given for n yield

J.B. Marion, T.W. Bonner, C.P. Cook, Phys. Rev. 100, 847 (1955).

$N^{14}_{7\ 7}$ $C^{(12)}(He^3,p\gamma)$

6.01 excitation $E_{He^3} = 1.55$

γ	100†	(1.64)	10% P_2 term
		(2.31)	spherical symmetry
	4.3±0.8†	(3.95)	
		(4.91)	

scin $p\gamma(\theta)$

H.E.Gove, A.E.Litherland, E.Almqvist, D.A. Bromley, Phys. Rev. 103, 835 (1956); Bull. Am. Phys. Soc. 1, No. 4, 196 N3 (1956).

Level $C^{13}(p,\gamma)$ $E_p = 1.16$

(6.23) $J = 1$

$(2.4\gamma)(6.23\gamma)(\theta)$ $J = 0,\ 1,\ 1$

S.Gorodetzky, A.Gallmann, M.Croissfaux,, R. Armbruster, Compt. rend, 242, 2545 (1956); J. phys. radium 17, 550 (1956).

Level $C^{13}(p,\gamma)$

8.06 level $E_p = 0.550$

γ	100†	(1.64)	100†	(4.11)
	140†	(2.31)	15†	(5.69)
	40†	(2.37)	15†	(5.75)
	5.5±1.0†	(3.95)		

scin $\gamma\gamma$

†From study of $(4.11\gamma)(3.95\gamma)/(4.11\gamma)(1.64\gamma)$ and $(2.31\gamma)(5.75\gamma)/(2.37\gamma)(5.69\gamma)$

P.Lehmann, A.Lévêque, R.Pick, Compt. rend. 243, 743 (1956).

$N^{(14)}(\gamma,p)$ $E_\gamma = 8.06$

Observed resonant absorption by broad level at ~8.06 of γ's from same level produced by $C^{13}(p,\gamma)$

G.M.Griffiths, Can. J. Phys. 34, 339 (1956).

Levels $N^{(14)}(\gamma,p)$ $E_\gamma \leq 23$

σ(Mev-mb)	Level	
0.6	(8.06)	cc for p groups
0.8	(9.18)	n,p background
1.2	(10.43)	identified

σ's consistent with those for inverse reaction

I.P.Wright, D.R.O.Morrison, J.M.Reid, J.E. Atkinson, Proc. Phys. Soc. 69A, 77 (1956).

Levels $C^{13}(p,p)$ $E_p = 1.5$ to 3.4

9.39		several angles
9.51	10.29	
9.70	10.43	

D.Zipoy, K.Famularo, G.D.Freier, Bull. Am. Phys. Soc. 1, No. 1, 9, AB3 (1956).

Level $C^{(12)}(d,p)$ $E_d = 0.2$ to 0.7

10.57 scin 0°, 120°

F.P.G.Valckx, Thesis, University of Utrecht (1956).

$N^{14}_{7\ 7}$ Levels $C^{(12)}(d,d)$ $E_d = 2.4$ to 3.4

12.309	$J = 4^-$	170°
12.608	$J = 3^+$	

M.T.McEllistrem, Phys. Rev. 100, 1253A (1955).

Levels $C^{(12)}(d,p)$ VdG, scin

E_d	Level	E_d	Level
2.465	12.38	4.004	13.70
2.669	12.55		Γ = 150 kev
2.992	12.83	5.336	14.84
3.388	13.17	5.635	15.09

$d,p_0(\theta)$ for $E_d \simeq 3.0, 4.0, 4.75$ shows $l = 1$ pattern

$d,p_1(\theta)$ for $E_d \simeq 4.75$ shows $l = 0$ pattern

$C^{(12)}(d,n)$ long counter

3.01	12.84 3	3.95	13.65 3	
3.36	13.14 3	4.61	14.21 3	

$d,n_0(\theta), d,n_1(\theta)$ shows $l = 1, l = 0$ resp. for $E_d \sim 4$

T.W.Bonner, J.T.Eisinger, A.A.Kraus,Jr., J.B.Marion, Phys. Rev. 101, 209 (1956).

Levels $B^{10}(\alpha,n)$ $E_\alpha = 2$ to 5.5

$B^{10}(\alpha,p\gamma)$ BF_3, scin γ

σ_n^*	$\sigma_{3.7\gamma}^{**}$	Level	Γ
0.9	12	13.16	0.03
0.6	12	13.23	0.20
1.1	8.0	13.68	0.20
	8.7	14.2	0.40
	13	14.43	0.2
	14	14.85	0.2
24	11	15.08	~0.05
21	13	15.44	0.1

*mb/sterad, 0° to 20° **mb/sterad, 40° to 50°

T.W.Bonner, A.A.Kraus, J.B.Marion, J.P. Schiffer, Phys. Rev. 102, 1348 (1956); Bull. Am. Phys. Soc. 1, No. 1, 20 DA3 (1956).

(a)	$C^{(12)}(d,n)10^mN^{13}$	$E_d = 20$
(b)	$C^{(12)}(d,t)20^mC^{11}$	stacked
No resonances observed		foils

Compound nucleus picture predicts for increasing E_d faster fall of σ(a), slower rise of σ(b) than observed

D.H.Wilkinson, Phys. Rev. 100, 32 (1955).

$N^{15}_{7\ 8}$ Levels $N^{(14)}(d,p)$ $E_d = 9$; s d,p(θ)

$(2J+1)\theta^2$	Level	l_n	$(2J+1)\theta^2$	Level	l_n
0.03	{(5.280) (5.305)}	2	0.40	(8.316)	0
			0.03	(8.571)	1?
0.04	(6.330)	1	0.03	{(9.062) (9.165)}	1
0.32	(7.165)	2			
0.45	(7.314)	0	0.14	(10.069)	1
0.41	(7.575)	2	0.24	~11.2	1

T.S.Green, R.Middleton, Proc. Phys. Soc. 69A, 28 (1956).

$N^{15}_{7\ 8}$

Level	$O^{(16)}(\gamma,p\gamma)$	$E_\gamma \geq 21$
γ	(6.33)	scin
No other γ (<20% of 6.33γ)		See also O^{15}

N. Svantesson, Bull. Am. Phys. Soc. 1, No. 1, 28, GA3 (1956).

Levels	$N^{14}(d,p)$		EA
(7.31)	Q = 1.308	*12*	
(7.58)	= 1.045	*12*	
(8.32)	= 0.2958	*6*	
(8.57)	= 0.038	*10*	

R. Chiba, R. A. Douglas, J. W. Broer, D. F. Herring, E. A. Silverstein, Phys. Rev. 100, 1253A (1955); verbal report.

Capture γ's	$N^{(14)}$(th n,γ)			s^{π} pr
15†	3.520 *20*	17†	6.323 *8*	
17†	3.669 *16*	9†	7.305 *12*	
16†	4.497 *11*	4†	8.313 *13*	
22†	5.259 *8*	0.2†	8.34 *4*	
35†	5.288 *7*	0.2†	9.03 *3*	
18†	5.534 *8*	1†	9.145 *10*	
14†	5.543 *8*	12†	10.833 *8*	

No 7.164 γ (< 0.8†)
†Photons/100 N radiative captures

P. J. Campion, G. A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.

Levels	$C^{14}(p,\gamma_0)$		E_p = 0.2 to 1.7	
	$C^{14}(p,n)$		E_p = 0.9 to 2.5	
J	Level	Γ_n(kev)	Γ_p(kev)	Γ_{γ_0}(ev)
	10.544[1]			< 0.004
$3/2^-$	10.707			0.12
$3/2^-$	10.810			0.010
$1/2^-$	11.290	1.6	10.4	0.29
$1/2^+$	11.43	32.8	8.2	2.15
$1/2^+$	11.61[2]	5.0	470[3]	26.3
$3/2^+$	11.76	36.5	0.5	
$5/2^-$	11.88	24.5	0.03	
$1/2^-$	11.96	21.2	0.3	
$5/2^-$	12.09	17.2	0.8	
$3/2^+$	12.15	38.0	15.0	
$5/2^+$	12.33	21.7	0.3	

Authors suggest 10.458 or 10.06 level is responsible for $\sigma[N^{14}(\text{th n},\gamma)]$
[1]Strong 7.1 capture γ observed which is not seen in N^{14}(th n,γ) spectra
[2]Possibly T = 3/2 analog to C^{15} g.s.
[3]Accounts fully for $\sigma[N^{14}(\text{th n},p)]$
J values from $p,\gamma_0(\theta)$, $p,n(\theta)$, σ_{nn}^*, σ_{np}^*

G. A. Bartholomew, F. Brown, H. E. Gove, A. E. Litherland, E. B. Paul, Can. J. Phys. 33, 441 (1955); Phys. Rev. 95, 595, 649A (1954); 96, 823A, 1154 (1954); Can. J. Phys. 34, 147 (1956); *Hinchey et. al., Phys. Rev. 86, 483 (1952).

$N^{15}_{7\ 8}$

Levels	$B^{11}(\alpha,n)$			E_α = 1.9 to 5.5		
	σ^*	Level	Γ(kev)	σ^*	Level	Γ(kev)
	23	12.50	59			
	11	12.90	90	16	13.72	40
	> 8.9	13.14	< 3	11	13.87	70
	17.7	13.17	~7	18	14.11	~10
	13	13.36	25	14	14.18	35
	14	13.59	20	24	14.66[$]	72

*mb/sterad, 0° to 20°
[$]Also observed in $B^{11}(\alpha,n+2.3\gamma)$

T. W. Bonner, A. A. Kraus, J. B. Marion, J. P. Schiffer, Phys. Rev. 102, 1348 (1956); Bull. Am. Phys. Soc. 1, No. 1, 20 DA3 (1956).

Levels	$C^{13}(d,p)$	E_d = 0.23 to 0.7
	16.47	scin, 0°, 120°
	16.63	

F. P. G. Valckx, Thesis, University of Utrecht (1956).

Levels	$C^{13}(d,p)$		E_d = 0.6 to 3.0
7.2*	16.70		scin 20°, 135°
38*	17.35	$\Gamma \sim 0.4$	
	18.08	$\Gamma \sim 0.05$	
	18.3	Γ = 0.270 *70*	

Narrow level at 18.06 not found
Values not corrected for barrier penetration
*Peak σ in mb, σ's given for other E_d.

J. B. Marion, G. Weber, Phys. Rev. 103, 167 (1956).

Levels			E_d = 1 to 3
Γ(kev)	$C^{13}(d,\alpha_0)$		$C^{13}(d,t_0)$ sd
broad	17.10		
200			17.22 4
400	17.35 4		17.35 4
200			17.57 4
600	17.69 5		
55 *10*	17.71 *1*		17.71 *1*
22 *4*	18.06* *1*		
50			18.08 *2*
27 *7*	18.36		

*$\sigma(E,\theta)$ shows l_d = 3,4; $\Gamma_d \sim 0.2$ kev
$d,\alpha_0(\theta)$, $\bar{d},t_0(\theta)$ show forward peaking for all E_d

J. B. Marion, G. Weber, Phys. Rev. 102, 1355 (1956)

Levels	$C^{13}(d,n)$	E_d = 0.4 to 4.2; VdG
	17.80 5	$\Gamma \sim 0.6$ thresh n,
	18.27 3	~0.4 ~0°
	19.15 3	~0.15

J. B. Marion, T. W. Bonner, C. P. Cook, Phys. Rev. 100, 847 (1955).

$N^{16}_{7\ 9}$
7^s

$\gamma(O^{16})$			$O^{(16)}$(fast n,p)	
3†	1.7	2300†	(6.13)	scin,
1†	1.9		(7.12)	scin $\gamma\gamma$
30†	2.7			

Continued

$N^{16}_{7\ 9}$ 7^s Continued

(1.7, 1.9 γ)(E_γ > 6.4) No (2.7 γ)(E_γ > 6.4)
(2.7γ)(E_γ > 3.5)(θ) contains significant terms in $\cos^4\theta$; $\eta(\pi) \sim +0.7$. See also O^{16}.
1% β branch to 8.87 level implied; logft = 4.4

D.H. Wilkinson, B.J. Toppel, D.E. Alburger, Phys. Rev. 101, 673 (1956).

$\gamma(O^{16})$	6.1	O^{18}(1.3-Mev d, α)
	7.1	scin

No 1.0 γ
$\sigma[O^{18}(d,\alpha)]/\sigma[C^{14}(d,\gamma)] > 400$ at E_d = 1.3 for 7^sN

N.A. Bostrom, E.L. Hudspeth, I.L. Morgan, Bull. Am. Phys. Soc. 1, No. 2, 94, M12 (1956); verbal report.

$\gamma(O^{16})$		F^{19}(n, α); $O^{(16)}$(n,p)
145†	(6.130)	scin pr
10†	7.116 *20*	

Both γ's decay with same τ ($7^s \pm 7\%$)
No evidence for an isomeric level of N^{16}

B.J. Toppel, Phys. Rev. 103, 141 (1956).

$\gamma(O^{16})$	N^{15}(3.3-Mev d, p)

6.13 and 7.12 γ's decay with same τ ($7^s \pm 10\%$)

$\gamma(N^{16})$	N^{15}(d, pγ)				E_d = 3.3
100†	0.1204 *10*	100†	0.276 *2*		pc,
5†	0.160 ?	10†	0.400 *5*		scin

No (0.120 γ)γ

R.C. Hanna, J.M. Freeman, J.O. Newton, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Levels	O^{18}(d, α)	E_d = 0.850; sd,
g.s.	Q = 4.237 *9*	4 angles
0.116 *6*		
0.300 *12*		
0.391 *12*		

No α's to levels from 0.391 to 1.24 (<15% of g.s. group at 135°)

R.T. Pauli, Arkiv Fysik 9, 571 (1955).

Levels	C^{14}(d, p)$2.4^s C^{15}$	E_d = 1.3 to 3.0
12.26	$\Gamma > 0.1$	
12.86	$\Gamma > 0.1$	

R.A. Douglas, B. Gasten, J. Downey, A. Mukerji, Bull. Am. Phys. Soc. 1, No. 1, 21, DA13 (1956).

$O^{14}_{8\ 6}$ 72^s

β^+	(4.1)	sl

4.1β^+/1.84β^+ = 0.60 ± 0.10%

R. Sherr, J.B. Gerhart, H. Horie, W.F. Hornyak, Phys. Rev. 100, 945 (1955).

$O^{15}_{8\ 7}$

Level	$N^{(14)}$(d, n)	E_d = 1.85; d, n(θ)	
g.s.	Q = 5.21 *7*	l_p = 1	

I. Nonaka, S. Morita, N. Kawai, T. Ishimatsu, S. Suematsu, K. Takeshita, Y. Nakajima, Y. Wakuda, J. Phys. Soc. Japan 11, 1 (1956).

$O^{15}_{8\ 7}$

Levels	$N^{(14)}$(d, n)	E_d = 1.0 to 4.5; VdG	
1^+	6.20 *3*	thresh n, ~0°	
4.6†	6.841 *9*		
0.9†	6.909 *9*		

Graph of $\sigma(\sim 0°)$ given for n yield
†Relative slow-n intensities at thresholds

J.B. Marion, R.M. Brugger, T.W. Bonner, Phys. Rev. 100, 46 (1955).

Level	$O^{(16)}$(γ, nγ)	$E_\gamma \geq 21$
γ	(6.14)	scin

No other γ (< 20% of 6.14γ) See also N^{15}

N. Svantesson, Bull. Am. Phys. Soc. 1, No. 1, 28, GA3 (1956); verbal report.

Levels	$N^{(14)}$(p, p)	E_p = 0.85 to 1.90
Level	J	s77152°
8.340	$1/2^+$	σ
8.798	$1/2^+$	
8.971	$3/2^-, 5/2^-$?	
9.030	$3/2^-, 5/2^-$?	

G.W. Tautfest, S. Rubin, Phys. Rev. 103, 196 (1956); Phys. Rev. 98, 280A (1955).

Level	N^{14}(p, p)	E_p = 0.95 to 3.96
10.33 *8*		pc, 132°

S. Bashkin, R.R. Carlson, J.A. Jacobs, Bull. Am. Phys. Soc. 1, No. 4, 212 SA9 (1956).

Levels	$C^{(12)}$(He^3, p)	E_{He^3} = 1.0 to 2.5
13.06	He^3, p(θ) varies rapidly	
13.52	with E_{He^3} for all	
13.96	p groups	

$C^{(12)}$(He^3, n)

σ(n)/σ(p) rises, then levels off
He^3, p(θ) and He^3, n(θ) similar

D.A. Bromley, H.E. Gove, A.E. Litherland, E.B. Paul, E. Almqvist, Bull. Am. Phys. Soc. 1, No. 4, 195 N2 (1956); verbal report.

$O^{16}_{8\ 8}$

Level	$O^{(16)}$(n, n'γ)	E_n = 7.06; scin	
γ	6.09 *6*	$\sigma(95°)$ = 8.3 *2* mb/sterad	

R.B. Day, Phys. Rev. 102, 767 (1956).

Levels	$O^{(16)}$(p, p')	E_p = 19, 10 angles	
$\int d\sigma$ in mb	Level	Coincidences	J
59	6.14 *2*		
34	7.02 *2*		
28	8.87 *3*	p'(~2.4°, ~6, ~7γ)	2^- ($3^\pm$?)
8	9.85 *3*	°2.78 4 in singles	
8	10.34 *3*		
19	11.08 *3*	p'(~6, ~7γ)	2^- (3^+?)
11	11.51 *3*		
6	12.02 *3*	p'γ	
11	12.53 *3*	p' (4.4γ in C^{12}?)	
~10	13.06 *3*		
	13.39		scin p

p, p'(θ) given for all but last two groups

W.F. Hornyak, R. Sherr, Phys. Rev. 100, 1409 (1955); 99, 632A (1955).

$O^{16}_{8\ 8}$

Level $F^{19}(p,\alpha)$ $E_p = 1.38$

(6.91) $\tau \leq 1.7 \times 10^{-14}$s

From new Doppler shift measurements giving range-velocity curve for O^{16} in Cu backing

S.Devons, G.Manning, J.H.Towle, Proc. Phys. Soc. 69A, 173 (1956).

Levels $O^{(16)}(\gamma,\gamma)$ γ's from $F^{19}(p,\alpha\gamma)$

(6.91) $\tau = 2.3^{+2.9}_{-0.9} \times 10^{-14}$s scin

(7.12) $\tau = 7^{+12}_{-3} \times 10^{-15}$s

C.P.Swann, F.R.Metzger, Bull. Am. Phys. Soc. 1, No. 4, 211 SA6 (1956); verbal report.

Level $F^{19}(p,\alpha\gamma)$ $E_p = 1.3$ to 4.1

8.87 2 level $J = 2^{-*}$ scin pr,

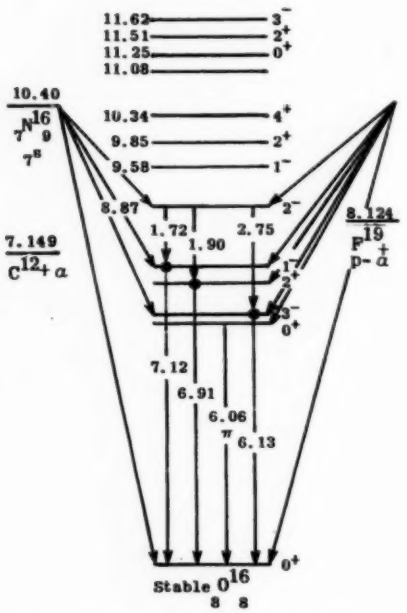
γ	3†	1.72 3	(6.13)	scin $\gamma\gamma$,
	1†	1.90 3	(6.91)	scin
	24†	2.75 2	(7.12)	

(2.75 γ)(6.13 γ) No (2.75 γ)(6.91, 7.12 γ)

(1.72, 1.90 γ)($E_\gamma > 6.3$) No 8.87γ (<3.8†)

*From γ intensities and (2.75 γ)(6.13 $\gamma(\theta)$)

This level is not predicted by α-particle model



D.H.Wilkinson, B.J.Toppel, D.E.Alburger, Phys. Rev. 101, 673 (1956), 99, 632A (1955).

Levels $N^{15}(p,\alpha\gamma)$ $E_p = 0.80$ to 3.80

Level	Γ(kev)		J	scin 4.43 γ,
12.95				p,$\gamma(\theta)$
13.09	125	15		
13.25				
13.67	65	10		
13.98 2	25	5		
14.92 3	45	10	4^+	
15.20 4	75	15	$2^-,3^+$	
15.25 5	700			
15.41 4	100	25	2^+ probable	

Continued

$O^{16}_{8\ 8}$

Continued

$N^{15}(p,\gamma)$ reaction shows 13.09 level only

R.R.Carlson, S.Bashkin, Bull. Am. Phys. Soc. 1, No. 4, 211 SA7 (1956); verbal report.

Levels $N^{15}(p,\alpha_0)$ $E_p = 0.95$ to 3.80

	13.09		pc,132°
	13.25		
50†	14.91 2		
~50†	15.25	broad	
100†	15.39 3		

13.67, 13.98, 15.20 levels not observed

†Total σ in mb

J.A.Jacobs, S.Bashkin, R.R.Carlson, Bull. Am. Phys. Soc. 1, No. 4, 212 SA8 (1956); verbal report.

Levels $N^{15}(p,\alpha_1\gamma)$ $E_p = 0.8$ to 3.2

	Level	Γ(kev)	scin γ
0.8†	13.235	22.5	
1†	13.666	95 ± 10	
~0.1†	13.976	<30	
1.1†	14.922	90 ± 20	

No level at 14.2

†Relative yield of C^{12} 4.4γ

R.R.Carlson, S.Bashkin, Phys. Rev. 100, 1254A (1955); verbal report.

Levels $N^{15}(p,\alpha\gamma)$ $E_p = 2.65$ to 5.25

Level	Γ(kev)	scin 4.43γ
14.92	60	
15.19	60	
15.40	95	
15.79	30	
16.43	25	

L.Lidofsky, K.Jones, R.Bent, J.Weil, T.Kruse, M.Bardon, W.W.Havens,Jr., Bull. Am. Phys. Soc. 1, No. 4, 212 SA10 (1956).

Levels* $O^{(16)}(\gamma,n)2.0^mO^{15}$ $E_\gamma \leq 23.2$

$\int\sigma dE$	Level	$\int\sigma dE$	Level	$\int\sigma dE$	Level
0.0046	15.85	0.182	17.68	0.617	20.79
0.040	16.03	0.254	17.84	0.857	20.93
0.027	16.47	0.059	18.04	1.36	21.21
0.041	16.75	0.094	18.70	0.853	21.52
0.084	16.95	0.130	19.01	2.21	22.37
0.111	17.02	0.396	19.18	3.14	22.54
0.262	17.13	0.495	20.33	3.47	22.76
0.404	17.18	0.603	20.58	3.06	23.02
0.202	17.55				

Estimates of Γ_γ show levels $\leq$ 19.2 are E2 excited, 22 to 23 are E1 excited

*Sharp breaks in activation curve

A.S.Penfold, B.M.Spicer, Phys. Rev. 100, 1377 (1955).

$O^{(16)}(\gamma,n)$ $E_\gamma = 17.6$ to 17.9

No resonance observed O in liquid scin

J.G.Campbell, Australian J. Phys. 8, 449 (1955); Phys. Rev. 95, 1357 (1954).

O^{16} 8 8

$O^{(16)}(\gamma,4\alpha)$ $E_\gamma \leq 70$, ppl

Levels in O^{16}, C^{12}, Be^8 connected by α emission

E_γ	O^{16}	C^{12}	Be^8
<25	22.3	9.6 ?	g.s., not 2.9
		10.8	g.s., not 2.9
		12.3 ? 3	not g.s.
25 to 28	26	15 to 16	?, not 4.1
	27.5		
28 to 35	29.5	16	2.9
	32.5	18 to 19	
	35		323 stars

W.K.Dawson, D.Livesey, Can. J. Phys. 34, 241 (1956).

Level $C^{(12)}(\alpha,\alpha_0 \text{ or } \alpha_1)$

23.54 *10* E_α = 20.4 to 22.6; s

$\alpha,\alpha_i(\theta)$ not symmetric about 90° c.m.

V.K.Rasmussen, D.W.Miller, W.B.Sampson, Phys. Rev. 100, 181 (1955).

$N^{(14)}(d,p+7.31\gamma)$ E_d = 2.4, 4.0, 5.3

$N^{(14)}(d,n+6.82\gamma)$ sl pr

$\sigma(d,p\gamma)/\sigma(d,n\gamma)$ = 2.6, 1.5, 0.9 for above E_d

R.D.Bent, T.W.Bonner, J.H.McCrary, W.A. Ranken, Phys. Rev. 100, 771 (1955).

O^{17} 8 9

Level $O^{(16)}(d,p)$ E_d = 0.483 to 0.677

g.s. $\sigma(E_d = 0.677)$ = 14.4 mb ppl

Values given of $a_1 \cdots a_4$ in $\Sigma a_i P_i(\theta)$ for $d,p(\theta)$

Some stripping indicated

$\int \sigma d\theta$ increases with E_d from 0.9 to 14.4 mb, values differ from those of Valckx* obtained with scin

B.Koudijs, Thesis, University of Utrecht (1956); *P.P.G.Valckx, Thesis, University of Utrecht (1956).

Level $O^{(16)}(d,p)$ E_d = 0.76 to 1.40

(0.872) ppl

Values given of $a_0 \cdots a_5$ in $\Sigma a_i P_i(\theta)$ for $d,p(\theta)$

Legendre coefficients vary greatly with E_d

M.K.Jurić, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 41 (1956).

Levels $O^{(16)}(d,p)$ E_d = 1.05 to 2.51

g.s. scin, 5° to 160°

(0.872)

$d,p(\theta)$ of stripping type except near resonance (E_d = 1.7) where curves are flattened

J.C.Grosskreutz, Phys. Rev. 101, 706 (1956).

Levels $O^{(16)}(d,p)$ E_d = 1.43 to 1.90

(g.s.) ppl

(0.872)

Graphs of $d,p(\theta)$ given

F.Alba, T.A.Brody, A.Fernández, M.Mazari, V. Serment, M.Vasquez, Anales Inst. Fisica Mexico, 1, 1 (1955); Rev. Mexicana Fiz. 4, 207 (1955).

O^{17} 8 9

Levels $O^{(16)}(d,p)$ E_d = 8.9

g.s.	$l_n = 2$
(0.872)	$l_n = 0$

d,p(θ)

P.A.El Bedewi, Proc. Phys. Soc. 69A, 221 (1956).

Levels $O^{(16)}(d,p)$ E_d = 9

Level	l_n
g.s.	2
(0.875)	0
(3.055)	d,p(θ) isotropic
(3.840)	3
(4.56)	1
(5.08)	2
5.23	

s; d,p(θ)

T.S.Green, R.Middleton, Proc. Phys. Soc. 69A, 28 (1956).

Levels $C^{(13)}(\alpha,n)$ E_α = 0.83 to 3.52

J	Level	Γ(kev)	J	Level	Γ(kev)
5/2	7.162	<8		8.341	20
5/2?	7.375	<5	5/2	8.400	<15
	7.570	<15	1/2	8.467	20
	7.679	30		8.498	<15
	7.93	150	1/2	8.70	90
	8.06	80		8.89	130
	8.21	75	5/2	8.96	70

$\alpha,n(\theta)$

R.B.Walton, J.D.Clement, Bull. Am. Phys. Soc. 1, No. 4, 211 SA5 (1956); verbal report.

Levels $C^{13}(\alpha,n)$ E_α = 2.0 to 5.2

σ*	Level	Γ(kev)	σ*	Level	Γ(kev)
2.7	7.94	100	17	8.95	30
6.7	8.06	100	3.5	9.15	≤8
14	8.20	80	≥17	9.2	≤5
≥12	8.335	≤6	7.4	9.50	15
24	8.40	10	28	9.725	25
10	8.465	10	6	9.78	70
≥36	8.50	≤7	38	9.885	15
9.1	8.70	90	6.8	9.97	200
20	8.89	150	30	10.20	65

*mb/sterad, 0° to 20°

T.W.Bonner, A.A.Kraus, J.B.Marion, J.P. Schiffer, Phys. Rev. 102, 1348 (1956); Bull. Am. Phys. Soc. 1, No. 1, 20 DA3 (1956).

Levels $C^{13}(\alpha,n)$ $\alpha,n(\theta)$

J	Level	J	Level
3/2	(8.19)	7/2	(9.50)
5/2	(8.40)	7/2	(9.72)
3/2(5/2?)	(8.50)	9/2	(9.88)
3/2(−?)	(8.70)	7/2	(9.97)
3/2	(8.89)		long counter

J.P.Schiffer, A.A.Kraus, Jr., J.B.Risser, Bull. Am. Phys. Soc. 1, No. 4, 211 SA3 (1956); verbal report.

O^{17} 8 9

Levels $C^{13}(\alpha,n)$ $E_\alpha = 1.5$ to 3.7; 0°
$O^{(16)}(n)$ $E_n = 4.4$ to 5.5

J	Level	J	Level	Γ_n/Γ_α
	8.06	≥ 3/2	**8.51**	
	8.21	3/2	**8.71**	~20
	8.35		**8.91**	
≥3/2	**8.41**		**8.97**	
	8.47		**9.20**	

Spins from $\sigma(0°)$ at resonance

R.L.Becker, H.H.Barschall, Phys. Rev. 102, 1384 (1956).

O^{18} 8 10

Level $O^{18}(p,p')$ $E_p = 4.58, 5.28$ sπ
1.981 *4*
2.445 level not observed

R.R.Spencer, G.C.Phillips, J.P.Schiffer, T.E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, M13 (1956).

Levels $F^{19}(n,d)$ $E_n = 14.1$ pc

st	g.s.	$Q = -5.79$ *8*	n,d(θ)
		$l_p = 0$	
w	**1.9**	$l_p = 2(1?)$	

No other levels below 3.0

F.L.Ribe, Phys. Rev. 100, 1254A (1955).

Levels $O^{17}(d,p)$ $E_d = 7.68, 7.83$
$O^{18}(d,d')$ 5 angles 28° to 90°

(1.986)	sd
3.555 *13*	

Levels predicted between 1.99 and 3.55 were not observed

D.R.Bach, P.V.C.Hough, Phys. Rev. 102, 1341 (1956).

Levels $F^{19}(t,\alpha)$ $E_t = 1.8$ sd; 90°

1.989 *24*		**5.311** *40*	
3.504 *34*		**5.456** *40*	
3.929 *40*		**6.190** *40*	
5.007 *40*		**6.328** *40*	
5.170 *40*			

N.Jarmie, Bull. Am. Phys. Soc. 1, No. 1, 28, GA4 (1956); verbal report.

O^{19} 8 11

Levels $O^{18}(d,p)$ $E_d = 0.800$ sd

g.s.	
(0.096)	

Values given of a_i in $\Sigma a_i P_i(\theta)$ for d,p(θ)

K.Ahnlund, Arkiv Fysik 10, 425 (1956).

F^{16} 9 7

$N^{(14)}(He^3,n)$ $E_{He^3} \leq 2.0$

Reaction not observed, g.s. $Q < -1.65$

J.W.Butler, Bull. Am. Phys. Soc. 1, No. 2, 94, M8 (1956).

F^{17} 9 8

Levels $O^{(16)}(d,n)$ $E_d = 1.8$ to 4.3; VdG
g.s. $Q = -1.626$ *4* thresh n, ~0°
0.499 *3*

Graph of $\sigma(\sim 0°)$ given for n yield

J.B.Marion, R.M.Brugger, T.W.Bonner, Phys. Rev. 100, 46 (1955).

Levels $N^{(14)}(\alpha,n)$ $E_\alpha = 8.16$
g.s. $Q = -4.76$ *7* a p-recoil,
0.53 *4* thresh n, ~0°

W.T.Doyle, A.B.Robbins, Phys. Rev. 101, 1056 (1956); 98, 1185A (1955).

Levels $O^{(16)}(p,p)$ $E_p = 2.5$ to 5.6

3.10	J = 1/2⁻*	**5.45**	Γ ~0.60
3.86		**5.66**	~0.50
~**4.7**	Γ~1.0	**5.83**	~0.60

*From $\sigma(90°)$ as $f(E_p)$

R.R.Henry, G.C.Phillips, C.W.Reich, J.L. Russell, Bull. Am. Phys. Soc. 1, No. 2, 96, N6 (1956).

F^{18} 9 9

Level $F^{19}(p,d)$ $E_p = 18.9$
8.5† g.s. $Q = -8.12$ *20*
†σ(11°) in mb/sterad $l_n = 0$ p,d(θ)

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Levels $O^{(16)}(He^3,p\gamma)$ $E_{He^3} = 2.0$ scin

γ	**0.94***	
	1.06*	**2.10**
	1.69	**2.49**

*$O^{18}(p,n\gamma)$ thresholds confirm these levels

J.W.Butler, H.D.Holmgren, W.E.Kunz, Bull. Am. Phys. Soc. 1, No. 1, 29, GA5 (1956); verbal report.

Levels $O^{18}(p,n\gamma)$ $E_p = 2.5$ to 4.2

0.950 *15*	$\tau > 0.1^{\mu\mu}s$	thresh n
1.050 *20*	$\tau < 0.1^{\mu\mu}s$	scin

Doppler shift observed for 1.05γ, not for 0.95γ

V.Naggiar, M.Roclawski-Conjeaud, D. Szteinsznaider, M.Thirion, J. phys. radium 17, 561 (1956); Compt. rend. 242, 1443 (1956).

Level $O^{(16)}(d,p)$ $E_d = 0.4$ to 0.7
8.11 scin, 0°, 120°

F.P.G.Valckx, Thesis, University of Utrecht (1956).

Levels $O^{(16)}(d,p_1)$ $E_d = 1.7$ to 4.6 pc 10°

9.18		**10.52**	
9.35		**10.74**	
9.43		**10.86**	
9.80		**11.04**	
9.95		**11.17**	
10.13		**11.4**	
10.34			

M.Roclawski-Conjeaud, E.Cotton, Nuclear Phys. 1, 603 (1956).

$F^{18}_{9\ 9}$

Levels $O^{(16)}(d,n)$ $E_d = 1.8$ to 4.3; VdG

9.5		10.4	thresh n,
9.6		10.6	~0°
9.7	$J = 2^+, 3^{+*}$	10.8	
10.1		11.0	
10.3		11.2	

*Increase of fast n's implies s wave to g.s.

J.B.Marion, R.M.Brugger, T.W.Bonner, Phys. Rev. 100, 46 (1955).

Level $O^{(16)}(d,\alpha)$ N^{14} 2.31 level
~14.5 from resonance at E_d ~7

C.P.Browne, Phys. Rev. 100, 1253A (1955); verbal report.

$F^{19}_{9\ 10}$

Levels $F^{19}(p,p'\gamma)$ $E_p = 0.873$, 0.935

γ (0.109) $\alpha_K = 0.00210$ 45 E1 sl,
(0.197) $\alpha_K = 0.00191$ 60 E2 scin
Used K/L = 8; corrected for anisotropy

W.R.Mills, Jr., H.H.Hilton, III, C.A.Barnes, Phys. Rev. 100, 1794A (1955).

$F^{19}(p,p'\gamma)$ CaF_2 on Cu foil
μ(0.197 level) = + 3.0 7 $\gamma\gamma(\theta,H)$

K.Sugimoto, A.Mizobuchi, Phys. Rev. 103, 739 (1956).

$F^{19}(n,p)O^{19} \rightarrow F^{19}$ HF solution
μ(0.197 level) = + 3.50 24 $\gamma\gamma(\theta,H)$

W.R.Phillips, G.A.Jones, Phil. Mag. 1, 576 (1956).

$F^{19}(p,p'\gamma)$ KF solution
μ(0.197 level) = + 3.70 45 $p,\gamma(\theta,H)$

P.Lehmann, A.Lévêque, M.Fiehrer, R.Pick, J. phys. radium 17, 560 (1956); Compt. rend. 241, 700 (1955). Phys. Rev. 104, 411 (1956).

$F^{19}(p,p'\gamma)$ $\gamma\gamma(\theta,H)$
μ(0.197 level) = + 3.4 9
Gyromagnetic ratios of 1.35 and -1.90 fit data

P.B.Tracey, Nature 176, 923 (1955).

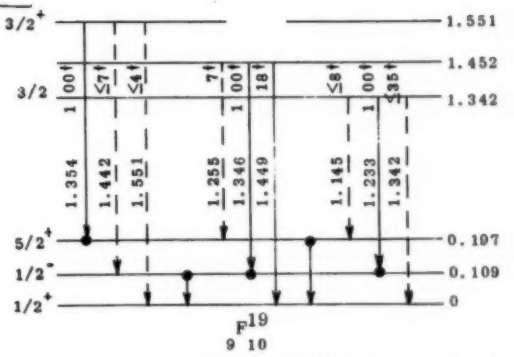
γ $F^{19}(p,p'\gamma)$ $E_p = 2.4$ to 4.1

(0.110)	scin $\gamma\gamma$, scin pr
(0.197)	1.346 10
1.233 10	1.354 10
1.255 ?	1.449 10

(0.110γ)(1.233, 1.346γ) No (0.110γ, (1.449γ)
(0.197$\gamma\gamma$)(1.354γ) delay observed
p(~1.24γ)(θ) $\eta(0) = +0.3$
p(~1.35γ)(θ) $\eta(0) = -0.3$
No 1.145γ, 1.442γ, 1.551γ

Continued

$F^{19}_{9\ 10}$ Continued



$F^{19}_{9\ 10}$

†Relative number of transitions from level

B.J.Toppel, D.H.Wilkinson, D.E.Alburger, Phys. Rev. 101, 1485 ; 100, 1254A (1956).

γ $F^{19}(n,n'\gamma)$ $E_n = 0.2$ to 1.8

(0.110)	scin γ
(0.197)	
1.37	Threshold at 1.55 2

All γ's show broad resonance at $E_n = 1.6$

J.J.Van Loef, D.A.Lind, Phys. Rev. 101, 103 (1956); 98, 224A (1955).

$F^{19}(n,p)O^{19} \rightarrow F^{19}$
(1.35 γ)(0.197 γ)(θ) implies J = 3/2, 5/2, 1/2

W.R.Phillips, G.A.Jones, Phil. Mag. 1, 576 (1956).

$F^{19}(n,p)O^{19} \rightarrow F^{19}$
(1.35 γ)(0.197γ) delay = $87^{m}\mu s$ 2 (half-life)

C.M.P.Johnson, Phil. Mag. 1, 573 (1956).

$F^{19}(p,p'\gamma)$ $E_p = 4.3$
(1.35 γ)(0.197γ) delay = $85^{m}\mu s$ 5 (half-life)

M.Fiehrer, P.Lehmann, A.Lévêque, R.Pick, Compt. rend. 241, 1746 (1955); Phys. Rev. 104, 411 (1956).

γ $F^{19}(n,n'\gamma)$ $E_n = 0.54$ to 3.7

(0.110)	
(0.197)	1.360 12
1.236 12	1.472 16
1.356 12	2.59* 4
(0.110 γ)(1.236, 1.356γ)	(0.197 γ)(1.360γ)

*Threshold at ~3.7

J.M.Freeman, Phil. Mag. 1, 591 (1956).

γ $F^{19}(n,n'\gamma)$ $E_n = 2.56$; scin

$\sigma(95°)$	$E\gamma$	$\sigma(95°)$	$E\gamma$
15 3	0.110 1	24 3	1.358 10
43 6	0.197 2	5 1	1.46 3
4 1	1.234 20	2 1	1.56 3

R.B.Day, Phys. Rev. 102, 767 (1956).

P^{19} 9 10

Levels $P^{19}(n,n')$ $E_n = 2.45$

$\sigma(90°)$	Level	
23 3	1.46 3	
23 3	1.55 3	σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Levels $P^{19}(d,d')$ $E_d = 8.9$

1.60 2 $l_d = 2$ s
2.83 2

F.A.El Bedewi, Proc. Phys. Soc. 69A, 221 (1956).

Levels $O^{18}(d,n)$ $E_d = 0.4$ to 4.5

6.184* 18
8.48* 2

*$l_n = 0$ from rate of rise of slow n yield

M.V.Harlow, J.B.Marion, R.A.Chapman, T.W. Bonner, Phys. Rev. 101, 214 (1956).

Level $O^{18}(p,\gamma)$ $E_r = 1.169$

9.068 J = 1/2

p(6.3 γ)(θ) $\gamma(0) = -0.15$

J.Butler, H.D.Holmgren, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

Levels $O^{18}(p,n)$ $E_p = 2.$ to 3.8

	Level	Γ(kev)	J	pc
40†	10.471 2	40		p,n(θ)
11†	10.542 6			
16†	10.586 2	35		
81†	10.839 2	60		
42†	10.957 2	45	3/2	
100†	11.050 2	65	1/2?	
93†	11.162 2	45	3/2	
58†	11.265 4		1/2?	
97†	11.365 20	85		
97†	11.511 20			

H.Mark, C.Goodman, Phys. Rev. 101, 768 (1956).

Levels $O^{18}(p,n)$ $E_p = 2.5$ to 4.3

10.480	11.170	BF_3
10.548	11.283	
10.600	11.446	
10.846	11.527	
10.976	11.650	
11.068	11.851	

V.Naggiar, M.Roclawski-Conjeaud, D. Szteinsznaider, J.Thirion, Compt. rend. 242, 1443 (1956).

$P^{19}(\gamma,p)$ $E_\gamma \leq 16.5$; 235 tracks

For $E_p = 4.4$ to 8.5, $\sigma(\theta) \sim 1 + 15\sin^2\theta$ ppl

$E_p = 2.9$ to 4.4, $\sigma(\theta) \sim 10 + 19\sin^2\theta$

W.B.Lasich, E.G.Muirhead, G.G.Shute, Australian J. Phys. 8, 456 (1955).

P^{20} 9 11

Levels $P^{19}(d,p)$ $E_d = 0.75$ to 1.45; ppl

1.0†	g.s.	no stripping	d,p(θ)
2.7†	(0.65)	$l_n = 2$	
2.1†	[(0.99) (1.06)]	$l_n = 0$	

†Relative values of $\int d\sigma$ at $E_d = 1.0$

S.Takemoto, T.Dazai, R.Chiba, S.Suganomata, S.Ito, Phys. Rev. 101, 772 (1956).

Levels $P^{19}(d,p)$ $E_d = 8.9$ d,p(θ)

$(2J+1)\theta^2$	Level	l_n	$(2J+1)\theta^2$	Level	l_n
0.00015	g.s.	0	0.036	(4.310)	0
0.00414	g.s.	2	0.007	5.04 2	1
0.080	(0.652)	2	0.010	5.19 2	1
0.005	(0.828)	2	0.018	5.27 2	1
0.005	(0.988)	2		5.72 2	
0.001	(1.059)	0	0.044	5.87 2	1
	(1.309)	*	0.09	5.95 2	1
0.081	(2.048)	2		6.25 2	
0.028	(2.195)	2	0.09	6.52 2	1
0.057	(2.870)	3	0.05	6.63 2	1
0.006	(2.966)	1	0.07	6.81 2	1
0.071	(3.491)	0		6.98 2	
0.071	(3.528)	0	0.04	7.20 2	1
0.021	(4.079)	0			

No level at ~2.5

*Isotropic

F.A.El Bedewi, Proc. Phys. Soc. 69A, 221 (1956).

Capture γ's F^{19}(th n,γ) sπ pr

45†	4.07 2	22†	5.54 2	
13†	5.10 2	15†	6.018 11	
25†	5.28 2	29†	6.599 11	

†Photons/100 F captures

P.J.Campion, G.A.Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.

Levels $F^{19}(n,n)$ Li(p,n)

E_o(kev)	Level	l_n	J	n,n(θ)
28	6.627	1	1^- or 2^-	
50	6.648	1	1^-	
99	6.694	1	1^-	

R.C.Block, H.W.Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

Levels $F^{19}(n,\alpha)7.4\,^8N^{16}$ $E_n = 3.0$ to 8.0

	9.8	90+	10.51 5	
50+	10.03 5	170+	10.61 5	
60+	10.11 5	190+	11.22 5	
40+	10.18 5	270+	12.2 1	

+Peak σ in mb

J.B.Marion, R.M.Brugger, Phys. Rev. 100, 69 (1955).

Levels $O^{18}(d,\alpha)$ $E_d = 0.7$ to 3.0

76†	13.59 1	$\Gamma \sim 0.50$	
87†	13.90 1	~0.40	

Continued

$P^{20}_{9\ 11}$ Continued

79†	14.25 *1*	~0.30
100†	14.94 *1*	>0.60

N.A.Bostrom, E.L.Hudspeth, I.L.Morgan, Bull. Am. Phys. Soc. 1, No. 2, 94, M12 (1956).

$P^{21}_{9\ 12}$ Levels $P^{19}(t,p)$ $E_t = 1.8$ sd; 90°

g.s	Q = 6.199 *30*
0.269	
1.087	
1.694	
2.036	

N.Jarmie bull. Am. Phys. Soc. 1, No. 1, 28, GA4 (1956); verbal report. Phys. Rev. 99, 1043 (1955).

$Ne^{19}_{10\ 9}$ Levels $P^{19}(p,n)$ $E_p = 4.2$ to 5.9; VdG thresh n, ~0°

g.s.	Q = -4.022 *5*
0.241 *4*	
0.280 *4*	

No other level below 1.5
Graph of $\sigma(\sim 0°)$ given for n yield

J.B.Marion, T.W.Bonner, C.P.Cook, Phys. Rev. 100, 91 (1955).

$Ne^{20}_{10\ 10}$ Levels $P^{19}(d,n)$ $E_d = 9.06$ scin n $d,n(\theta)$

Level	l_p
g.s.	0
(1.63)	2
~7.3	0 and 2
(9.3)	1

J.M.Calvert, A.A.Jaffe, E.E.Maslin, Proc. Phys. Soc. 68A, 1017 (1955).

Level $Na^{23}(p,\alpha)$ $E_p = 1.22$

(1.63) $\tau = 53 \times 10^{-14}$s *23*

From Doppler shift. Stopping power estimated.

S.Devons, G.Manning, J.H.Towle, Proc. Phys. Soc. 69A, 173 (1956).

Levels $Ne^{(20)}(p,p')$ $E_p = 18$ scin

1.63	7.45
4.26	7.85
4.97	9.20
5.81	10.0

$p,p'(\theta)$ studied for the above levels.

G.Schrank, G.K.O'Neill, Bull. Am. Phys. Soc. 1, No. 1, 29, GA7 (1956).

Levels $P^{19}(p,\alpha\gamma)$ p res. calibration

Level	E_o	Γ(kev)	$s\pi$
13.1935 *3*	0.3405 *3*	3.3 *2*	
13.6977 *4*	0.8713 *4*	4.5 *2*	

F.Bumiller, H.H.Staub, H.E.Weaver, Helv. Phys. Acta. 29, 83 (1956); 28, 355A (1955).

$Ne^{20}_{10\ 10}$ Levels $P^{19}(p,\alpha\pi)$ $E_p = 1.3$ to 5.5 sl pr

15.86	$\Gamma \sim 0.16$		
16.06	= 0.09	16.60	Γ = 0.27
16.20	= 0.10	16.98	= 0.10

14 additional levels observed for above E_p

W.A.Ranken, J.H.McCrary, T.W.Bonner, Bull. Am. Phys. Soc. 1, No. 2, 95, N1 (1956).

Resonances $P^{19}(p,n)$ long counter, ~0°
Peaks found at E_p = 5.3, 5.4?, 5.75

J.B.Marion, T.W.Bonner, C.P.Cook, Phys. Rev. 100, 91 (1955).

$Ne^{21}_{10\ 11}$ Levels $Ne^{(20)}(d,p)$ $E_d = 8.6$ s; $d,p(\theta)$

	Level	l_n
	g.s.	$d,p(\theta)$ isotropic
128†	0.35 *10*	2
	1.73 *10*	
68†	2.78 *5*	0
50†	4.58 *5*	2
98†	4.81 *5*	1
53†	5.43 *6*	2
49†	5.63 *6*	2
21†	5.78 *6*	1
	5.89 *8*	
	6.10* *8*	
46†	6.72 *6*	2

No 3.73 level
*Isotopic assignment uncertain
† Relative values of $\int \sigma d\theta$

H.B.Burrows, T.S.Green, S.Hinds, R.Middleton, Proc. Phys. Soc. 69A, 310 (1956).

γ $Ne^{(20)}(d,p\gamma)$ $E_d = 1.13$ scin $p\gamma$

0.35 *3*
1.05 *3*
1.42 *3*
2.78 *3*

S.Gorodetzky, T.Muller, M.Port, Compt. rend. 242, 1281 (1956); J. phys. radium 17, 549 (1956).

$Ne^{22}_{10\ 12}$ Levels $O^{18}(\alpha,n)$ $E_\alpha = 1.9$ to 5

σ*	Level	Γ(kev)	σ*	Level	Γ(kev)
0.3	11.47	30	16	12.63	~200
0.9	11.68	<15	13	12.86	~40
2.3	11.75	25	16	13.03	~40
2.6	11.89	<15	29	13.11	~40
5.2	12.07	~40	42	13.20	~100
9.2	12.31	~70	27	13.35	~70
*mb/sterad, 0° to 30°			31	13.60	~40

T.W.Bonner, A.A.Kraus, J.B.Marion, J.P. Schiffer, Phys. Rev. 102, 1348 (1956).

$O^{18}(\alpha,n)$ Po α's, $E_\alpha = 2.4$ to 5 BF_3

No resonances observed

R.R.Roy, A.Lagasse, M.L.Goes, R.Moerman, Compt. rend. 241, 1567 (1955).

Ne^{23} 10 13 40^{s}

β^- **3.9** *3* $Na^{23}(n,p)$; scin
$\gamma(Na^{23})$ **0.440** *5* scin
No 1.7, 3.0 γ's (< 10%, 1% of 0.440γ resp.)
$\beta\gamma/\beta = 1/3$ from Au^{198} comparison

H. J. Gerber, M. G. Muñoz, D. Maeder, Phys. Rev. 101, 774 (1956); Helv. Phys. Acta 28, 478A (1955).

Ne^{23} 10 13

Levels $Ne^{(22)}(d,p)$ $E_d = 8.6$ s; d, p(θ)

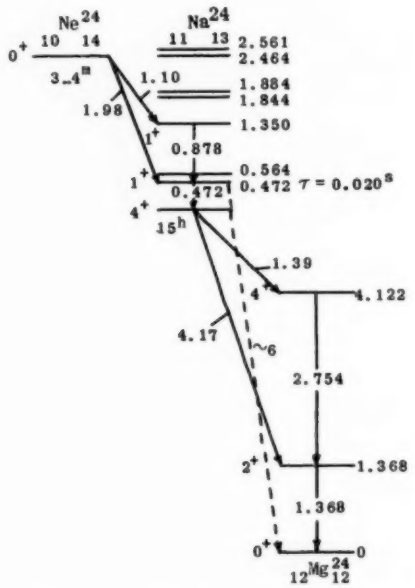
	Level	l_n
102†	g.s.	2
84†	**(0.98)**	0

† Relative values of $\int \sigma d\theta$

H. B. Burrows, T. S. Green, S. Hinds, R. Middleton, Proc. Phys. Soc. 69A, 310 (1956).

Ne^{24} 10 14 3.4^{m}

$Ne^{(22)}$(1.5-Mev t, p) chem
τ 3.38^{m} *2*
β^- 8% **1.10** *5* scin $\beta\gamma$
92% **1.98** *5* scin
$\gamma(Na^{24})$ 8† **0.878** *9* scin
$(1.10\beta)(0.878\gamma)$ scin
p 15^{h} Na^{24}, Growth of 2.75γ observed
No 0.092γ, 0.564γ (< 0.5†) No 0.785γ (<1†)
No γ with $E_\gamma > 1.2$ (< 1†). p 0.02^{s} Na^{24}, q.v.



B. J. Dropesky, A. W. Schardt, Phys. Rev. 102, 426 (1956); 100, 954A (1955).

Na 11 Relative isotopic abundances ms
Na^{23} **100.0%**
No Na^{21} (< 1×10^{-6}%) No Na^{22} (< 3×10^{-6}%)

F. A. White, T. L. Collins, F. M. Rourke, Phys. Rev. 101, 1786 (1956).

Na^{21} 11 10

Levels $Ne^{(20)}(d,n)$ $E_d = 1.1$ to 3.0
1.46 *4* thresh n, ~0°
2.426 *37*

J. B. Marion, J. C. Slattery, R. A. Chapman, Phys. Rev. 103, 676 (1956).

Na^{22} 11 11

Levels $F^{19}(\alpha,n)$ $E_\alpha = 8.15$
g.s. Q = **-2.0** *2* a p-recoil
0.45 *20* thresh n, ~0°
1.15 *20* **2.25** *20*
1.8? *2* **3.0** *2*

A. R. Quinton, W. T. Doyle, Phys. Rev. 101, 669 (1956); 97, 252A (1955).

Levels $Ne^{(20)}(d,p)$ $E_d = 0.8$ to 1.1
12.07 p's to Ne^{21} 0.35 level
12.13 p's to Ne^{21} 1.73 level
No resonance for p's to Ne^{21} 2.84 level a pc

S. Gorodetzky, T. Muller, M. Port, Compt. rend. 240, 1704, 2224 (1955).

Na^{22}? 11 11

$Na^{23}(\gamma, n?\gamma)$ $E_\gamma \leq 22$
No γ with $\gamma\gamma$ delay $\geq 10^{\mu s}$ scin

S. H. Vegors, Jr., P. Axel, Phys. Rev. 101, 1067 (1956).

Na^{23} 11 12

Level $Na^{23}(p,p')$ $E_p = 4.4$ to 4.7
0.437 *5* s??

J. P. Schiffer, C. R. Gossett, G. C. Phillips, T. E. Young, Phys. Rev. 103, 134 (1956); Bull. Am. Phys. Soc. 1, No. 2, 95, N2 (1956).

Level $Na^{23}(p,p'\gamma)$ $E_p = 1.288$
(0.440) $J = 5/2^{+*}$ p, $\gamma(\theta)$
*From p, $\gamma(\theta)$, assuming p- and f-wave protons and channel spin 2

R. W. Krone, W. G. Read, Bull. Am. Phys. Soc. 1, No. 4, 212 SA11 (1956).

Level $Na^{23}(p,p'\gamma)$
(0.440) $\tau < 14^{\mu\mu s}$ recoil

C. P. Swann, W. C. Porter, Bull. Am. Phys. Soc. 1, No. 1, 29, GA11 (1956); verbal report.

Level $Na^{23}(n,n')$ $E_n = 2.45$
$\sigma(90°)$ Level pulsed n's
50 *10* **0.46** *5* σ units: mb/sterad

L. Cranberg, J. S. Levin, Phys. Rev. 103, 343 (1956).

$Na^{23}_{11\ 12}$

Levels $Ne^{(22)}(d,n)$ $E_d = 1.1$ to 3.0
8.435 *21* thresh n, ~0°
9.012 *24*
Low intensities suggest assignment to Na^{23}

J.B.Marion, J.C.Slattery, R.A.Chapman, Phys. Rev. 103, 676 (1956).

γ $Na^{23}(n,n'\gamma)$ $E_n = 0.8, 5.1$
0.15 *2* scin γ
0.44* *2* 1.63 *2*
0.61 *2* 2.07 *2*
*$\sigma(E_n = 0.8, 100°) = 0.087$ *12* b/sterad

I.L.Morgan, Phys. Rev. 103, 1031 (1956); Bull. Am. Phys. Soc. 1, No. 2, 96 N11 (1956); priv. comm.

γ $Na^{23}(n,n'\gamma)$ $E_n = 2.5$; scin
0.45 *1*
1.69 *3*

E.A.Wolf, Phil. Mag. 1, 102 (1956).

$Na^{24}_{11\ 13}$ 15^h g.s.

β^- 1.400 s $\pi\beta,\beta\gamma$
F-K linear ($E_\beta > 0.450$)

E.F.De Haan, G.J.Sizoo, Physica 21, 818 (1955).

$\gamma(Mg^{24})$ (1.38) 4.01 scin
(2.75) 5.3

F.M.Tomnovec, C.S.Cook, Phys. Rev. 100, 1254A (1955); verbal report.

$\gamma(Mg^{24})$
100† (1.38) s π Cp
102† (2.75)

B.S.Dželepov, J.V.Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956).

$\beta(1.38\gamma)$ delay = $25^{\mu\mu s}$ *17* scin

C.F.Coleman, Phil. Mag. 46, 1135 (1955).

$Na^{24}_{11\ 13}$ 0.02^s

τ $0.020^{s\ +30\ -15}$ $3.4^m Ne^{24}$ source
β^- ~6 scin
$\gamma(Na^{24})$ 0.472 *5* scin
d 3.4^mNe. Separated by electric field
Observation of expected 4.6 β^- prevented by presence of Ne^{23}

B.J.Dropesky, A.W.Schardt, Phys. Rev. 102, 426 (1956); 100, 954A (1955).

$Na^{24}_{11\ 13}$

Capture γ's Na^{23}(th n,γ) scin Cp
60† 0.48 *2* 5† 1.66 *5*
34† 0.86 *2* 12† 2.02 *3*
6† 1.35 *3* 19† 2.53 *3*
Study covered $E_\gamma = 0.3$ to 3
†Photons/100 Na captures, (±20%) ($\sigma_a = 0.5$)

T.H.Braid, Phys. Rev. 102, 1109 (1956); 90, 355A (1953).

Resonance Na^{23}(n,n) Li(p,n)
peak 0.053 J = 3^- or 2^-? n,n(θ)
$l_n = 1$

R.C.Block, H.W.Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

Resonance $Na^{23}(n,n'\gamma)$ $E_n = 0.44$ to 0.80
peaks 0.542 scin 0.440γ
0.602* 0.710*
0.633$ 0.780$
*n, γ isotropic $n, γ anisotropic

H.Hausman, J.E.Monahan, F.P.Mooring, S.Raboy, Bull. Am. Phys. Soc. 1, No. 1, 56, R7 (1956); verbal report.

$Na^{25}_{11\ 14}$ 62^s

$\gamma(Mg^{25})$ $Mg^{(25)}$(fast n,p)
80† 0.37 *1* 74† 0.975 *10* scin
100† 0.58 *1* 1.35 ?
No 0.46γ

M.E.Nahmias, T.Yuasa, J. phys. radium 17, 373 (1956).

$\gamma(Mg^{25})$ $Mg^{(25)}$(14-Mev n,p)
95† 0.40 100† 0.98 scin
98† 0.58 33† 1.61
No β^- to 0.58 level in Mg^{25} (< 1% of β's)

H.E.Gove, A.E.Litherland, E.B.Paul, G.A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 29, GA8 (1956); verbal report.

Mg_{12}

Relative isotopic abundances ms
Mg^{24} 78.8% *2*
Mg^{25} 10.15%*10*
Mg^{26} 11.00% *10*
No Mg^{21} ($< 8 \times 10^{-5}$%) No Mg^{22} ($< 25 \times 10^{-5}$%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

$Mg^{24}_{12\ 12}$

Levels Na^{23}(d,n) $E_d = 8.4$
0.04+ g.s. ic p-recoil
0.2+ (1.368)
0.4† (4.122) $l_p = 2$
2+ (4.23) $l_p = 0$
0.32+ 5.1
0.32+ 5.5
3+ 6.3
4.3+ 7.5 $l_p = 0$ and 2
4.4+ 8.4 $l_p = 0$
†Peak σ in mb/sterad

J.M.Calvert, A.A.Jaffe, A.E.Litherland, E.E. Maslin, Proc. Phys. Soc. 68A, 1008 (1955).

$Mg^{24}_{12\ 12}$

Level	$Mg^{(24)}(n,n')$	$E_n = 2.45$
$\sigma(90°)$	Level	pulsed n's
31 *3*	**1.38** *3*	σ units: mb/sterad

L. Cranberg, J. S. Levin, Phys. Rev. 103, 343 (1956).

Level	$Mg^{(24)}(n,n'\gamma)$	$E_n = 2.56$
$\sigma(95°)$	Level	scin
γ 49 4	**1.368** *10*	σ units: mb/sterad

R. B. Day, Phys. Rev. 102, 767 (1956).

Levels	$Na^{23}(p,\gamma)$		$E_p \leq 0.53$; EA
	Level	E_p	Γ (kev)
1†	**11.943**	0.2508 *2*	0.3 *2*
110†	**11.998**	0.3078 *3*	0.8 *3*
2†	**12.061**	0.3735 *4*	2.0 *10*
4†	**12.126**	0.4438 *6*	0.8 *3*
65†	**12.193**	0.5109 *6*	0.8 *3*

†Relative γ yield

D. A. Hancock, F. Verdaguer, Proc. Phys. Soc. 68A, 1080 (1955).

Levels	$Na^{23}(p,p)$		$E_p \leq 1.5, 155°$; VdG	
E_o	Level	Γ (kev)	Γ_p (kev)	J
0.797	**12.477**			
0.815	**12.484**			
0.878	**12.544**	8	6.8	1^+
0.922	**12.586**			
1.022	**12.682**	66 or 50	66 or 50	2^-
1.177	**12.831**	4	2.8	1^+
1.321	**12.969**			3^+
1.398	**13.042**	1	0.7	3^+
	$Na^{23}(p,\alpha)$		$E_p \leq 1.5, 155°$; VdG	
1.288	**12.937**			
1.460	**13.102**			

N. P. Baumann, P. W. Prosser, Jr., R. W. Krone, Phys. Rev. 100, 1244A (1955); verbal report.

Capture γ	$Na^{23}(p,\gamma)$	$E_p = 0.593$
12.27 level		D(γ,p) in ppl
γ (10.9)	E1	p,γ(L_+)

Result indicates even parity for Na^{23} g. s.

I. S. Hughes, D. Sinclair, Proc. Phys. Soc. 69A, 125 (1956).

$Mg^{25}_{12\ 13}$

Level	$Mg^{(25)}(n,n'\gamma)$	$E_n = 2.56$
$\sigma(95°)$	Level	scin
γ 15 *3*	**1.616** *16*	σ units: mb/sterad

R. B. Day, Phys. Rev. 102, 767 (1956).

Levels	$Mg^{25}(p,p'\gamma)$	$E_p = 1.5$ to 2.9
1.61 level		
γ > 96%	**1.61**	scin

No 0.63γ, 1.03 γ (< 1%, 3% resp. of 1.61γ)

Continued

$Mg^{25}_{12\ 13}$

Continued

1.96 level			
γ	(0.40)	55%	1.38
	(0.58)	28%	1.96
17%	0.98		

(0.58γ)(0.40, 0.98, 1.38γ)

H. E. Gove, A. E. Litherland, E. B. Paul, G. A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 29, GA8 (1956); verbal report.

Capture γ	$Mg^{(24)}$(th n,γ)	scin Cp
49†	**2.80** *3*	

Study covered $E_\gamma = 0.3$ to 3
†Photons/100 Mg captures, (±20%) ($\sigma_a = 0.057$)
(Max in Mg^{25}, Mg^{26}, Mg^{27} = 44, 45, 11†)

T. H. Braid, Phys. Rev. 102, 1109 (1956); 91, 442A (1953).

Capture γ's	$Mg^{(24)}$(th n,γ)	sm pr
5†	**2.816** *16*	
1†	**3.408** *18*	

P. J. Campion, G. A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.

Resonance	Mg^{24}(n)	$E_n = 0.002$ to 0.35
peak 60°	0.085	J = 3/2$^-$ Li(p,n)
$^*\sigma_t$ (peak)		Γ = 0.008

A. Taylor, H. Marshak, H. W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 62 UA3 (1956); verbal report.

Resonance	$Mg^{(24)}$(n,n)	Li(p,n)
peak	0.085 J = 3/2$^-$	n,n(θ)
	$l_n = 1$	

R. C. Block, H. W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

$Mg^{26}_{12\ 14}$

Level	$Mg^{(26)}(n,n'\gamma)$	$E_n = 2.56$
$\sigma(95°)$	Level	scin
γ 12 2	**1.820** *18*	σ units: mb/sterad

R. B. Day, Phys. Rev. 102, 767 (1956).

Capture γ's	$Mg^{(25)}$(th n,γ)	scin Cp
13†	**1.07** *5*	
22†	**1.87** *3*	

Study covered $E_\gamma = 0.3$ to 3
†Photons/100 Mg captures, (±20%) ($\sigma_a = 0.057$)
(Max in Mg^{25}, Mg^{26}, Mg^{27} = 44, 45, 11†)

T. H. Braid, Phys. Rev. 102, 1109 (1956); 91, 442A (1953).

$Mg^{26}_{12\ 14}$ Capture γ's* $Mg^{(25)}$(th n,γ) sπ pr

8.55 2	10.08 2
8.93 2	11.086 25

*In addition to other known γ's

P. J. Campion, G. A. Bartholomew, Bull. Am. Phys. Soc. 1, No. 1, 28, GA2 (1956); verbal report.

Resonance peaks Mg^{25}(n) E_n = 0.002 to 0.35 Li(p,n)

0.020	$\Gamma \sim 0.001$
0.081	~ 0.009
0.101	~ 0.010

A. Taylor, H. Marshak, H. W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 62, UA3 (1956); verbal report.

$Mg^{27}_{12\ 15}$ 9.5^m $\gamma(Al^{27})$ $Mg^{(26)}$(pile n,γ) chem scin

0.66†	0.175 15
70†	0.834
30†	1.015

β/γ = 1.00 5 pc β, scin γ

No (0.834 γ)(1.015 γ) scin

W. S. Lyon, N. H. Lazar, Phys. Rev. 101, 1524 (1956).

$Mg^{27}_{12\ 15}$ Levels Al^{27}(n,p) E_n = 14; ppl several angles

< 0.2†	g.s.
1†	1.0
10†	3.5
	5.7

†% of charged particles (p and d)

R. K. Haling, Bull. Am. Phys. Soc. 1, No. 1, 29, GA9 (1956); verbal report.

Resonance peak Mg^{26}(n) E_n = 0.002 to 0.35 Li(p,n)

~ 0.320

A. Taylor, H. Marshak, H. W. Newson, Bull. Am. Phys. Soc. 1, No. 1, 62, UA3 (1956); verbal report.

Al$_{13}$ Relative isotopic abundances ms

Al^{27} 100.0%

No Al^{25}, Al^{26} ($< 15 \times 10^{-5}$%)

No Al^{28}, Al^{30} ($< 5 \times 10^{-5}$%)

No Al^{29} ($< 2 \times 10^{-5}$%)

F. A. White, T. L. Collins, F. M. Rourke, Phys. Rev. 101, 1786 (1956).

$Al^{25}_{13\ 12}$ 7.6^s $Mg^{(24)}$(0.26-Mev p,γ) scin $\gamma/\gamma^{\pm}$

No 0.98γ (< 0.5%)

T. Stribel, Z. Naturf. 11a, 166 (1956).

$Al^{25}_{13\ 12}$ Levels Mg^{24}(p,γ) E_p = 0.4 to 3 scin γ, $\gamma\gamma$, p,$\gamma(\theta)$

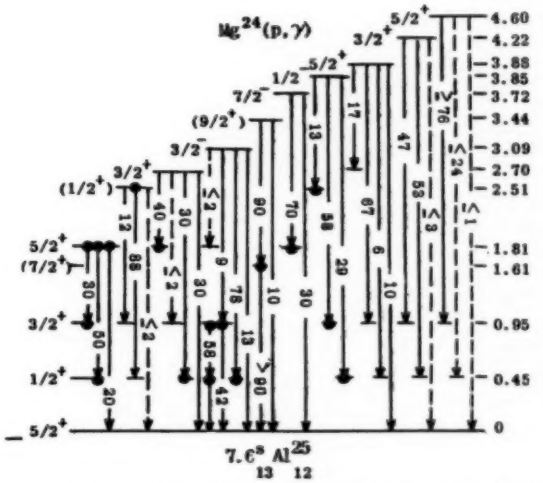
Level	J
g.s.	$5/2^+$
0.45	$1/2^+$

Continued

$Al^{25}_{13\ 12}$ Continued

Level	J
0.95	$3/2^+$
1.61	$(7/2^+)$
1.81	$5/2^+$
2.51	$(1/2^+)$
2.70	$3/2^+$
3.09	$3/2^-$
3.44	$(9/2^+)$
3.72	$7/2^-$
3.85	$1/2^-$
3.88	$5/2^+$
4.22	$3/2^+$
4.60	$5/2^+$

Levels constructed from capture γ's shown in level scheme



7.6^s $Al^{25}_{13\ 12}$

Numbers in decay lines are branching ratios of γ's

A. E. Litherland, E. B. Paul, G. A. Bartholomew, H. E. Gove, Phys. Rev. 102, 208 (1956); 99, 644A; 1649A (1955); Bull. Am. Phys. Soc. 1, No. 1, 28 GA1 (1956).

Levels Mg^{24}(p,p' + 1.37γ) E_p = 2 to 3 p,$\gamma(\theta)$ scin

Level	J
4.22	$3/2^+$
4.60	$5/2^+$
4.90	$\geq 5/2$
5.06	
5.09 ?	
5.11	$\geq 5/2$

A. E. Litherland, E. B. Paul, G. A. Bartholomew, H. E. Gove, Phys. Rev. 102, 208 (1956).

Levels $Mg^{(24)}$(p,p'γ) E_p = 1.5 to 4.2 p,$\gamma(\theta)$, p,p'(θ)

Level	J	
4.22	$3/2^+$	
4.60	$5/2^+$	
5.09	$1/2$,	$(3/2^+?)$
5.14	$5/2^+$	?
5.75	$3/2^-$	
6.14	$1/2$,	$(3/2^+?)$

H. W. Lewis, W. T. Joyner, Bull. Am. Phys. Soc. 1, No. 6, 280 B3 (1956).

$Al^{25}_{13\ 12}$ Capture γ's $Mg^{(24)}(p,\gamma)$ scin

2.50 level	$E_o = 0.222$		
0.46 5	10†	**1.54** 5	
0.95 7	100†	**2.04** 3	
2.69 level	$E_o = 0.418$		
0.45 5	80†	**1.33** 3	
330† **0.85**	50†	**1.80** 2	
330† **0.88** 3	110†	**2.24** 2	
330† **0.95**	100†	**2.69** 2	
3.08 level	$E_o = 0.825$		
0.45 4			
0.95 3	100†	**2.62** 2	
> 6†, < 20† **2.12** 3	40†	**3.08** 3	

H. Ager-Hanssen, O.M.Lönsjö, R.Nordhagen, Phys. Rev. 101, 1779 (1956).

Capture γ's $Mg^{(24)}(p,\gamma)$ $E_p \sim 0.238$; scin

2.50 level	$E_o = 0.222$	$\Gamma < 2$ kev
0.454 5		
5† **0.97** 3		
14† **1.56** 3		
100† **2.05** 2		

(0.454 γ)(2.05 γ) (0.97 γ)(1.56 γ)

p(2.05 γ)(θ) isotropic

D.S.Craig, Phys. Rev. 101, 1479 (1956).

Capture γ's $Mg^{24}(p,\gamma)$ $E_p = 0.418$

2.69 level	$J = 3/2^+$	scin p,$\gamma(\theta)$
(2.24)	E2/M1 = 0.004	
(2.69)	E2/M1 = 0.35	

J.Varma, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

$Al^{26}_{13\ 13}$ $\sim 10^{6y}$ g.s. $Si^{(28)}$(5-Mev d,α)

β^+ 1†	**1.17** 5	$\Delta J = 3$, no shape	scin
$\gamma(Mg^{26})$ ~1†	**1.76** 10		scin

M.J.Laubitz, Proc. Phys. Soc. 68A, 1033 (1955).

$Al^{26}_{13\ 13}$ Levels $Mg^{25}(p,\gamma)$ $E_p = 0.675$ to 0.960

Level	J	T	scin $\gamma,\gamma\gamma$, p,$\gamma(\theta)$
g.s.	5^+	0	
0.23	0^+	1	
0.42	3^+	0	
1.07		0	
1.76	2^+	0	
1.86			
2.08	2^+	0	
2.09	2^+	1	
2.32			
2.54			
3.16	$2^+,3^+$	1	
3.67			
3.76			

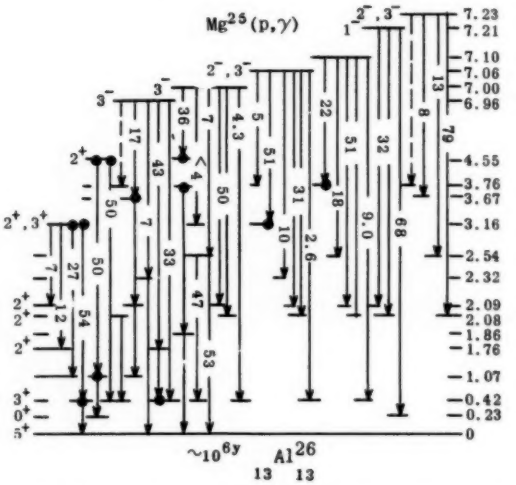
Continued

$Al^{26}_{13\ 13}$ Continued

E_o	Level	J	$(2J+1)\Gamma_\gamma$(ev)
	4.55	2^+	
0.675	**6.96**	3^-	3.5
0.720	**7.00**	3^-	2.8
0.777	**7.06**	$2^-,3^-$	1.9
0.820	**7.10**		1.2
0.940	**7.21**	1^-	1.5
0.960	**7.23**	$2^-,3^-$	3.8

Levels constructed from capture γ's shown in level scheme

2.07 and 3.27 γ's, also observed at 0.960 resonance, not fitted into level scheme



Numbers in decay lines are branching ratios of γ's

L.L.Green, J.J.Singh, J.C.Willmott, Proc. Phys. Soc. 69A, 335 (1956).

Levels $Na^{23}(\alpha,n)$ $E_\alpha = 8.16$

g.s.	Q = −2.9 2	a p-recoil
0.3 2*		thresh n, ~0°
1.0 2		
1.4 2	**2.5** 2	
1.8 2	**2.9** 2	

*6.7$^s\beta^+$ first appears at Q = −3.2 2 scin $\gamma^\pm$

W.T.Doyle, A.B.Robbins, Phys. Rev. 101, 1056 (1956).

Level $Si^{(28)}(d,\alpha)$ $E_d = 5.5$ to 7.5

0.228 5 s

Yield decreases from 62% of g.s. group at 15° to 0 beyond 60° for $E_d = 7.03$

C.P.Browne, Bull. Am. Phys. Soc. 1, No. 4, 212 SA13 (1956).

Level $Al^{27}(p,d)$ $E_p = 18$; p,d(θ)

$l_n = 2$ for group to g.s., 0.22, or 0.42 level or all three

J.B.Reynolds, K.G.Standing, Phys. Rev. 101, 158 (1956); 95, 639A (1954).

Al^{27} 13 14

	ground state	
J	5/2	I
$\|\mu\|$	3.6385 *3*	

L.C.Brown, D.Williams, J.Chem. Phys. 24, 751 (1956).

Levels $Mg^{24}(\alpha,p)$ $E_\alpha = 8$ pc 90°

g.s.	Q = −1.63 *7*	
0.85 *4*		2.17 *4*
1.06 *4*		2.64 *4*

H.G.Graetzer, A.B.Robbins, Bull. Am. Phys. Soc. 1, No. 6, 280 B2 (1956).

Levels $Al^{27}(p,p'\gamma)$ recoil

(0.840), (1.010) } $\tau < 70^{\mu\mu s}$

C.P.Swann, W.C.Porter, Bull. Am. Phys. Soc. 1, No. 1, 29, GA11 (1956).

Levels $Mg^{(26)}(d,n)$ $E_d = 1.0, 6.0$ ppl; d,n(θ)

Level	l_p
1.00	2
2.31	3
2.94	1
6.75	0
8.2	1

B.Trumpy, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Level $Al^{27}(n,n')$ $E_n = 2.45$ pulsed n's

σ(90°)	Level	
20 *2*	1.03 *3*	σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Levels $Al^{27}(d,d')$ $E_d = 9$ s 45°

(2.23), (2.75), (3.04)

Graphs of d,d'(θ) given

S.Hinds, R.Middleton, Proc. Phys. Soc. 69A, 347 (1956).

Capture γ $Mg^{26}(p,\gamma)$ $E_p = 0.339$ $D(\gamma,p)$ in ppl

8.59 level

(7.75) E1 p,γ(L_1)

Result indicates even parity for Al^{27} 0.84 level

I.S.Hughes, D.Sinclair, Proc. Phys. Soc. 69A, 125 (1956).

γ $Al^{27}(n,n'\gamma)$ E_n ? 2.56; scin

σ(95°)	E_γ	σ(95°)	E_γ
0.13 *3*	0.166 *3*	11 *1*	1.017 *10*
5.1 *6*	0.840 *8*	6.9 *6*	2.21 *2*

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Al^{27} 13 14

γ $Al^{27}(n,n'\gamma)$ $E_n = 3.7$; scin

0.835 *10*	σ(90°) = 22 mb/sterad	
1.02 *1*	σ(90°) = 41 mb/sterad	
1.72 *2*		
1.91 *2*		
2.22 *3*		

M.A.Rothman, H.S.Hans, C.E.Mandeville, Phys. Rev. 100, 83 (1955).

γ $Al^{27}(n,n'\gamma)$ $E_n = 3.6$; scin

σ(100°)	E_γ	σ(100°)	E_γ
30 *6*	0.85 *2*		1.74 *2*
50 *10*	1.01 *2*	56 *11*	2.23 *2*
	1.40 *2*	σ units: mb/sterad	

I.L.Morgan, Phys. Rev. 103, 1031 (1956).

Al^{28} 13 15 2.3^m

τ 2.31^m *6* Si^{28}(12.5-Mev n,p)

A.V.Cohen, P.H.White, Nuclear Phys. 1, 73 (1956).

Al^{28} 13 15

Levels $Al^{27}(d,p)$ $E_d = 6,7$; several angles, s

g.s.	Q = 5.502	
0.029	2.279	3.294
0.973	2.490	3.347
1.017	2.589	3.461
1.372	2.663	3.537
1.633	2.988	3.591
2.143	3.011	3.669
2.207	3.102	3.704

78 additional levels from 3.878 to 7.731 listed

W.W.Buechner, M.Mazari, A.Sperduto, Phys. Rev. 101, 188 (1956); 99, 644A (1955).

Levels $Al^{27}(d,p)$ $E_d = 6$; 5° to 60° s

Level	l_n	Level	l_n
g.s.	0		
0.031	0	3.347	0
1.017	2,0	3.461	1
2.143	0	3.591	1
2.663	2	3.669	0
3.294	0	3.704	0

Weak p groups corresponding to 11 levels below 3.59 approx. isotropic

H.A.Enge, W.W.Buechner, A.Sperduto, M.Mazari, Bull. Am. Phys. Soc. 1, No. 4, 212 SA12 (1956).

Levels $Mg^{25}(\alpha,p)$ $E_\alpha = 8$ pc 90°

g.s.	Q = −1.29	
1.00 *4*		
1.57 *4*		2.54 *4*
2.18 *4*		2.96 *4*

H.G.Graetzer, A.B.Robbins, Bull. Am. Phys. Soc. 1, No. 6, 280 B2 (1956).

$Al^{28}_{13\ 15}$

Capture γ's Al^{27}(th n,γ) scin Cp

10†	0.97 3	
14†	2.26 3	
42†	2.5 to 3.1	

†Photons/100 Al captures, (±20%) (σ_a = 0.21)

T.H.Braid, Phys. Rev. 102, 1109 (1956).

Al^{27}(d,pγ) time of flight

p(0.032γ) delay = $1.9^{m\mu s}$ 2

J.C.Severiens, S.S.Hanna, Phys. Rev. 100, 1254A (1955); verbal report.

Resonance Al^{27}(n,n) Li(p,n)

peak 0.090 J = 3 n,n(θ)

l_n = 0 or 1 ?

R.C.Block, H.W.Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

$Al^{29}_{13\ 16}$ 6.6^m

$\gamma(Si^{29})$ 15† 1.28 Si^{29}(14-Mev n,p); scin

1† 2.43

No 1.15, 2.03γ

D.A.Bromley, H.E.Gove, A.E.Litherland, E.B. Paul, E.Almqvist, Bull. Am. Phys. Soc. 1, No. 1, 30, GA12 (1956).

$Al^{29}_{13\ 16}$

Levels Mg^{26}(α,p) E_α = 8

g.s. Q = −2.90 pc 90°

1.69? 4

H.G.Graetzer, A.B.Robbins, Bull. Am. Phys. Soc. 1, No. 6, 280 B2 (1956).

$Si^{28}_{14\ 14}$

Levels Al^{27}(d,n) E_d = 9.02

Level	l_p	
0.18*	g.s.	2 ic p-recoil
0.49+	1.78	0
0.21+	~4.7	
2.3+	~6.4	0
0.59+	7.10	
2.4+	7.55	0
5.9+	8.18	0
15+	9.16	0
1+	10.2	0

+mb/sterad at 0° *mb/sterad at 30° peak

J.M.Calvert, A.A.Jaffe, A.E.Litherland, E.E. Maslin, Proc. Phys. Soc. 68A, 1008 (1955).

Level $Si^{(28)}$(n,n'γ) E_n = 0.35 to 3.9

γ 1.78 2 scin

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

Level Si(n,n'γ) E_n = 3.7; scin

γ 1.78 2 $\sigma(90°)$ = 60 mb/sterad

M.A.Rothman, H.S.Hans, C.E.Mandeville, Phys. Rev. 100, 83 (1955).

$Si^{28}_{14\ 14}$

Level Al^{27}(p,γ) E_p = 0.99

(1.78) $\tau > 0.6^{\mu\mu s}$ (or $< 0.02^{\mu\mu s}$)

From Doppler shift. Stopping power estimated.

S.Devons, G.Manning, J.H.Towle, Proc. Phys. Soc. 69A, 173 (1956).

Level Al^{27}(p,γ) sπ,p res. calibr.

12.545 E_p = 0.9908 2

F.Bumiller, H.H.Staub, Helv. Phys. Acta 28, 355A (1955).

Capture γ Al^{27}(p,γ) E_p = 0.652

12.23 level D(γ,p) in ppl

(10.4) E1 p,$\gamma(L_-)$

Result indicates even parity for Al^{27} g.s.

I.S.Hughes, D.Sinclair, Proc. Phys. Soc. 69A, 125 (1956); 67A, 481 (1954).

γ Al^{27}(d,pγ) E_d = 4.6

2.8†	6.9 1	0.6†	8.75 4	sl pr
2.4†	7.38 6*	1.0†	9.08 4	
2.3†	7.55 6*	0.7†	9.45 8	
1.9†	7.91 4	0.4†	9.87 8	
0.8†	8.28 4	0.1†	10.7 2	

†Average σ in mb for E_d = 2.7 to 4.6

May also belong to $^{\$}Mg^{25}$, Al^{28}; *Al^{28}

R.D.Bent, T.W.Bonner, J.H.McCrary, W.A. Ranken, Phys. Rev. 100, 774 (1955).

Resonance Al^{27}(p,γ) sπ,p res. calibr.

0.9908 2

F.Bumiller, H.H.Staub, H.E.Weaver, Helv. Phys. Acta 29, 83 (1956).

$Si^{29}_{14\ 15}$

Levels $Si^{(28)}$(d,p) E_d = 4.44

g.s.	Q = 6.229 40	s
1.237	6.453	
2.038	6.728	
2.416	7.000	
3.083	7.577	
3.662	7.820	
4.223?	8.354	
4.931	8.832	
5.944	9.112?	
6.138?		

L.M.Khromchenko, Doklady Akad. Nauk SSSR 98, 761 (1954).

Level $Si^{(29)}$(n,n'γ) E_n = 0.35 to 3.9

γ 1.29 scin

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$Si^{29}_{14\ 15}$

Level	$Si^{29}(p,p'\gamma)$		E_p = 2.5 to 3.0	
	2.03 level	$J = 5/2^+$		p,γ(θ)
γ	1† 0.75	99† 2.03		scin
	1† 1.28			

(0.75γ)(1.28γ)

D. A. Bromley, H. E. Gove, A. E. Litherland, E. B. Paul, E. Almqvist, Bull. Am. Phys. Soc. 1, No. 1, 30, GA12 (1956).

Capture γ's	$Si^{(28)}$(th n,γ)	scin Cp
14†	1.26 *3*	
19†	2.13 *3*	
11†	2.65 *3*	
49†	3.60 *6*	

†Photons/100 Si captures, (±20%) (σ_a = 0.16)
(Max in Si^{29}, Si^{30}, Si^{31} = 74, 13, 13†)

T. H. Braid, Phys. Rev. 102, 1109 (1956); 91, 442A (1953).

γ	P^{31}(d,?γ)				E_d = 4.6
4.1†	4.41 4	2.5†	6.11 4		sl pr
5.0†	4.71 4	1.6†	6.84 4		
5.0†	4.94 4	0.7†	7.46 *8*		
3.7†	5.29 4	0.4†	8.16 4		
3.5†	5.79 4	0.3†	8.53 4		

γ's may also be assigned to P^{32} or Si^{32}
†Average σ in mb for E_d = 2.6 to 4.6

R. D. Bent, T. W. Bonner, J. H. McCrary, W. A. Ranken, Phys. Rev. 100, 774 (1955).

Resonance peaks	$Si^{(28)}$(n,n'γ)	E_n = 0.35 to 3.9 scin 1.78γ
	1.9	
	2.08	2.35
	2.27	2.45

R. B. Day, A. E. Johnsrud, D. A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

Resonances	$Si^{(28)}$(n,p)2.3^{m}Al	
0.03*	5.14 ?	E_n = 4.4 to 8.0
0.09*	5.62 5	
0.28*	6.51 5	
0.35*	6.81 5	
0.37*	7.45 *10*	Γ~0.3

*Peak σ's (±50%)

J. B. Marion, R. M. Brugger, R. A. Chapman, Phys. Rev. 101, 247 (1956).

$Si^{30}_{14\ 16}$

Levels	Al^{27}(α,p)		E_α = 8
	g.s.	Q = 2.38 *3*	ppl,pc,scin
	2.23 2		4 angles
	3.52 2		
	3.80 4	5.94 4	
	4.83 2	6.52 *3*	
	5.28 2	7.10 *3*	
	5.52 *3*	7.38 *5*	

No 5.07, 5.62 levels

F. L. Hassler, F. E. Steigert, G. P. Pieper, Bull. Am. Phys. Soc. 1, No. 6, 280 B4 (1956).

$Si^{30}_{14\ 16}$

Level	$Si^{(30)}$(n,n'γ)	E_n = 0.35 to 3.9
γ	2.19	scin

R. B. Day, A. E. Johnsrud, D. A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$P^{29}_{15\ 14}$

Levels	Si^{28}(p,p'+1.78γ)			
w	5.27			scin
64†	5.72	w	6.56	
	5.95		6.82	
	6.18		7.01	
	6.31		7.25	
w	6.47		7.44	
w	6.52	w	7.48	

†σ(0°) in mb/sterad

H. B. Willard, J. K. Bair, H. O. Cohn, J. D. Kington, Bull. Am. Phys. Soc. 1, No. 5, 264 F4 (1956); Phys. Rev. 99, 644A (1955); verbal report.

$P^{30}_{15\ 15}$ 2.5^m

τ	2.56^m *15*	P^{31}(18-Mev p,pn)
β^+	3.24 4	sl
No ce	No 2.32γ	sl ce,scin

D. Green, J. R. Richardson, Phys. Rev. 101, 776, (1956); 96, 858A (1954).

$P^{30}_{15\ 15}$

Levels	$S^{(32)}$(d,α)	E_d = 1.6 to 2.9
~1†	g.s.	Q = 4.831 *13* s 63°, 90°
~1†	0.693*	
	1.44	
	1.97	

*High yield suggests T≠1

L. L. Lee, Jr., F. P. Mooring, Bull. Am. Phys. Soc. 1, No. 6, 281 B8 (1956).

Levels	Si^{29}(p,γ)					scin γ,γγ
5.95 level	E_o = 0.414			$(2J+1)\Gamma_\gamma$ = 0.23 ev		
γ 100†	0.69*	100†	5.33*	~1†	(5.95)	
6.22 level	E_o = 0.696			$(2J+1)\Gamma_\gamma$ = 0.11 ev		
γ 45†	0.70	37†	2.53			
30†	1.25	51†	2.74	66†	4.29	
15†	1.46	56†	3.53	12†	4.80	
29†	1.97	34†	3.74	w	(6.22)	
6.26 level	E_o = 0.737			$(2J+1)\Gamma_\gamma$ = 0.11 ev		
γ 22.7†	0.71	0.8†	1.95			
0.5†	1.00	8.9†	2.09	7.6†	2.91	
1.7†	1.19	2.8†	2.18	29.8†	3.39	
36.8†	1.47	17.9†	2.23	1.25†	4.18	
6.44 level	E_o = 0.916					
γ 42.7†	0.7	15.1†	1.94	2.0†	4.01	
2.2†	1.02	10.3†	2.22	12.4†	4.41	
1.6†	1.22	1.2†	2.94	1.8†	5.35	
9.4†	1.48	10.0†	3.43	19.4†	5.72	

Continued

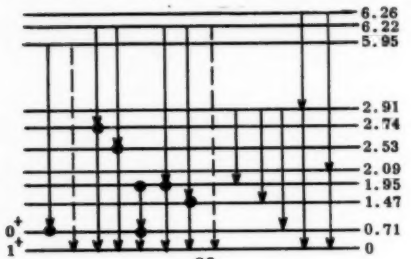
P^{30} 15 15

Continued

6.49 level $E_o = 0.970$

γ 12.8†	0.71				
3.3†	1.22	4.7†	2.50	1.2†	3.83
18.8†	1.44	3.4†	2.68	3.9†	3.94
1.5†	1.73	5.8†	2.95	6.9†	4.48
13.6†	1.97	2.3†	3.25	7.1†	4.99
5.3	2.22	12.6†	3.35	5.8†	6.42

*Isotropy of 0.69γ and strong anisotropy of 5.33γ suggest J = 0$^+$, T = 1 for 0.69 level



P^{30}
15 15

C. Broude, L.L. Green, J.J. Singh, J.C. Willmott, Phys. Rev. 101, 1052 (1956); priv. comm.

P^{31} 15 16

Level $P^{31}(n,n')$ $E_n = 2.45$ pulsed n's

$\sigma(90°)$	Level
51 7	1.25 3

σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

Level $P^{31}(p,p')$ $E_p = 3$ to 4 sd 90°

1.264 4

No 0.4, 0.9 levels

D.M. Van Patter, C.P. Swann, W.C. Porter, C.E. Mandeville, Phys. Rev. 103, 656 (1956); Bull. Am. Phys. Soc. 1, No. 1, 39 JA1 (1956).

Levels $P^{31}(p,p')$ $E_p = 3.0, 4.6$ sd; 90°

1.264 4
2.234 8
3.133 10
3.290 10

D.M. Van Patter, C.P. Swann, M.A. Rothman, W.C. Porter, C.E. Mandeville, Amsterdam Conf. Nuclear Reactions, July 1956; Bull. Am. Phys. Soc. 1, No. 1, 39 JA1 (1956); verbal report; Physica 22 (1956).

Levels $Si^{30}(p,\gamma)$ $E_p = 1.7$ to 2.3

Level	J	
1.26	3/2$^+$	p,$\gamma\gamma(\theta)$
2.23	$\geq$5/2$^+$	

E_o			
1.73	8.96	3/2$^+$	p,$\gamma_o(\theta)$
1.82	9.05	3/2$^+$?	

E.B. Paul, G.A. Bartholomew, H.E. Gove, A.E. Litherland, Bull. Am. Phys. Soc. 1, No. 1, 39, JA2 (1956).

P^{32} 15 17 14^d

$S^{(32)}(n,p)$

β^- 1.712 4 F-K linear sl

A.V. Pohm, R.C. Waddell, E.N. Jensen, Phys. Rev. 101, 1315 (1956).

$e^+/\beta^- = 7.5 \times 10^{-10}$ 20 sl $\gamma^\pm\gamma^\pm$

Not corrected for external pair creation

Theoretical value* for internal pair creation is 5.5×10^{-10}

J.S. Greenberg, M. Deutsch, Phys. Rev. 102, 415 (1956); 99, 665A (1955); *K. Huang, Phys. Rev. 102, 422 (1956).

$S^{(32)}(n,p)$ chem

$e^+/\beta^- < 1.3 \times 10^{-5}$ cc

No new light positive particle ($< 8 \times 10^{-4}$%)

Spectral shape of internal bremsstrahlung agrees with theory scin

A.B. Milojević, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 21 (1956).

P^{32} 15 17

Level $S^{(32)}(n,p\gamma)$ $E_n = 2.56$ scin

$\sigma(95°)$	Level	
γ 1.0 2	0.077 2	σ units: mb/sterad

R.B. Day, Phys. Rev. 102, 767 (1956).

Capture γ's $P^{31}(th\ n,\gamma)$ scin Cp

28†	0.51 2
14†	1.13 3
41†	2.19 3

Study covered $E_\gamma = 0.3$ to 3

†Photons/100 P captures, (±20%) ($\sigma_a = 0.19$)

T.H. Braid, Phys. Rev. 102, 1109 (1956); 90, 355A (1953).

γ $P^{31}(d,?\gamma)$ $E_d = 4.6$

For possible γ's in P^{32} see Si^{29}, Bent et al.

S 16

Relative isotopic abundances ms

S^{32}	95.0%
S^{33}	0.760% 4
S^{34}	4.22% 1
S^{36}	0.014%

P. Bradt, F.L. Mohler, V.H. Dibeler, J. Research Nat. Bur. Standards 57, 223 (1956).

S^{32} 16 16

Levels $Cl^{(35)}(p,\alpha)$ $E_p = 7.04$

g.s. Q = 1.863 8 s 90°, 130°

2.237 8	
3.780 8	4.465 10
4.287 8	4.698 10

P.M. Endt, C.H. Paris, A. Sperduto, W.W. Buechner, Phys. Rev. 103, 961 (1956); Bull. Am. Phys. Soc. 1, No. 4, 223 W1 (1956).

S^{32} 16 16

Levels	$P^{31}(d,n)$		$E_d = 9.2$
1.9†	g.s.	$l_p = 0$	ic p recoil
0.35†	2.25	$l_p = 2$	
1.3†	(3.81), (4.32), (4.50)	$l_p = 0$	
0.46†	(4.74), (5.04)		
1.2†	5.83	$l_p = 2$	

†Peak σ in mb/sterad
No 0.5, 1.5 levels

J.M.Calvert, A.A.Jaffe, A.E.Litherland, E.E. Maslin, Proc. Phys. Soc. 68A, 1008 (1955).

Level	$S^{(32)}(n,n'\gamma)$		$E_n = 2.56$
	$\sigma(95°)$	Level	scin
γ	14 *1*	2.23 *2*	σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Level	$S^{(32)}(n,n'\gamma)$		$E_n = 3.7$
	$\sigma(100°)$	Level	scin
γ	36 *7*	2.20 *2*	σ units: mb/sterad

I.L.Morgan, Phys. Rev. 103, 1031 (1956).

γ	$S^{(32)}(n,n'\gamma)$	$E_n = 3.7$; scin
	2.25 *3*	

M.A.Rothman, H.S.Hans, C.E.Mandeville, Phys. Rev. 100, 83 (1955).

γ	$P^{31}(d,?\gamma)$	$E_d = 4.6$

For possible γ's in S^{32} see Si^{29}, Bent et al.

Resonance peaks	$P^{31}(p,\alpha)Si^{28}$ g.s.		sd 90°
	(1.892)		
	(2.030)	~(2.827)	
	~(2.658)	~(2.860)	

No 2.733 resonance peak

Resonance peaks	$P^{31}(p,p')P^{31}$ 1.26 level		sd 90°
	(3.060)		
	(3.246)	3.73	
	3.58	3.79	

Many unresolved resonances with $3.57 < E_o < 4.00$

D.M.Van Patter, C.P.Swann, W.C.Porter, C.E. Mandeville, Phys. Rev. 103, 656 (1956).

S^{33} 16 17

Levels	$Cl^{(35)}(d,\alpha)$		$E_d = 3.0$ to 7.5
	g.s.	Q = 8.277 *10*	s
	0.844 *6*		
	1.966 *7*	3.840 *9*	
	2.312 *8*	3.947 *9*	
	2.869 *8*	4.060 *9*	
	2.938 *8*	4.105 *9*	
	2.969 *8*	4.159 *9*	
	3.227 *8*	4.224 *9*	
	3.365 *8*	4.749 *10*	

No 4.42 level observed. See also S^{35}

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

Capture γ's	$S^{(32)}$(th n,γ)	scin Cp
56†	0.84 *2*	
1†	1.52 *5*	
37†	2.34 *3*	

Study covered $E_\gamma = 0.3$ to 3
†Photons/100 S captures, (±20%) ($\sigma_n = 0.49$)

T.H.Braid, Phys. Rev. 102, 1109 (1956); 90, 355A (1953).

S^{34} 16 18

Levels	$Cl^{(37)}(p,\alpha)$		$E_p = 7.04$
	g.s.	Q = 3.026 *8*	s 90°, 130°
	2.127 *8*	4.114 *8*	
	3.302 *8*	4.621 *8*	
	3.915 *8*	4.685 *8*	
	4.073 *8*	4.876 *8*	

No 0.8 level

P.M.Endt, C.H.Paris, A.Sperduto, W.W.Buechner, Phys. Rev. 103, 961 (1956); Bull. Am. Phys. Soc. 1, No. 4, 223 W1 (1956).

Levels	$Cl^{(37)}(p,\alpha)$		$E_p = 3.77$, 3.82
	g.s.	Q = 3.015 *11*	sd 90°
	2.129 *14*		

D.M.Van Patter, C.P.Swann, W.C.Porter, C.E. Mandeville, Phys. Rev. 103, 656 (1956); Bull. Am. Phys. Soc. 1, No. 1, 39 JA1 (1956).

Levels	$P^{31}(\alpha,p)$	
	$P^{31}(\alpha,p\gamma)$	
	g.s.	Q = 0.7 *1*
	2.14 *2*	4.30 *6*
	3.40 *5*	4.8 *1*

No 0.8 level 1.20γ/3.33γ = 2.7 *5*
Level energies are weighted averages of values found by scin p, scin γ, and abs p

G.S.Stanford, G.F.Pieper, Phys. Rev. 103, 637 (1956); 98, 1185A (1955).

$S^{35}_{16\ 19}$ Levels $Cl^{(37)}(d,\alpha)$ $E_d = 3.0$ to 7.5

g.s.	Q = 7.783 *12*	s
1.992* *10*	2.714 *10*	
2.348* *10*	4.025* *10*	

*From weak groups. Assignable to S^{33} or S^{35}

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

$S^{37}_{16\ 21}$ 5.0m β^- (90%) 1.6; (10%) ~4.7 $A^{(40)}(n,\alpha)$; scin

$\gamma(Cl^{37})$ 100† 3.12

No other γ with $E_\gamma < 2$ (< 1†)

H.Morinaga, E.Bleuler, Bull. Am. Phys. Soc. 1, No. 1, 30, H2 (1956); verbal report.

$\gamma(Cl^{37})$ 3.09 *3* $Cl^{(37)}$(fast n,p); scin

T.Stribel, Z. Naturf. 11a, 254 (1956).

$Cl^{33}_{17\ 16}$ Resonances $S^{(32)}(p,p)$ $E_p = 1.8$ to 4.0 62° to 167°; scin

E_o	Γ(kev)	J
1.900	8.5	$3/2^-$
2.30	52	$1/2^-$
2.575	≤5	
2.810	~6	$3/2^-$
2.902	≤5	
2.917	≤5	
3.092	≤4	$3/2^+,5/2^+$
3.194	≤4	
3.265	32	$1/2^+$
3.381	≤4	$5/2^-,7/2^-$
~3.5*	300	
3.718	≤4	

*Probably double

J.W.Olness, W.Haeberli, H.W.Lewis, Bull. Am. Phys. Soc. 1, No. 4, 212 SA14 (1956); verbal report.

Resonances $S^{(32)}(p,p'\gamma)$ $E_p = 2.7$ to 3.8 scin 2.2γ

2.810
2.902
2.917
3.094*
3.195*
3.379*
3.716*

*p,$\gamma(\theta)$ anisotropic, Γ < 2 kev

H.W.Lewis, J.W.Olness, W.Haeberli, Bull. Am. Phys. Soc. 1, No. 4, 213 SA15 (1956).

$Cl^{34}_{17\ 17}$ 32m τ 32.40m 4 $Cl^{(35)}$(18-Mev p,pn)

β^+ 26† 1.33 *10*; 26† 2.48 *7*; 47† 4.50 *3* sl F-K linear ($E_\beta > 3.0$)

D.Green, J.R.Richardson, Phys. Rev. 101, 776 (1956); 96, 858A (1954).

$Cl^{34}_{17\ 17}$ 32m $Cl^{(35)}$(20-Mev p,pn)

(1.16γ)(2.10γ)(θ) scin

Consistent with J = 2, 2, 0 and E2/M1 = 0.0177 *64* for 1.16γ

H.E.Handler, J.R.Richardson, Phys. Rev. 102, 833 (1956).

$Cl^{35}_{17\ 18}$ Levels $Cl^{(35)}(p,p')$ $E_p = 3.63$ to 3.83 sd 90°

1.219 *5*
1.760 *4*

D.M.Van Patter, C.P.Swann, W.C.Porter, C.E. Mandeville, Phys. Rev. 103, 656 (1956); Bull. Am. Phys. Soc. 1, No. 1, 39 JA1 (1956).

Levels $Cl^{35}(p,p')$ $E_p = 4.6$ to 5.6 s??

1.220 *5*
1.766 *5*

No 0.7 level

J.P.Schiffer, C.R.Gossett, G.C.Phillips, T.E.Young, Phys. Rev. 103, 134 (1956); Bull. Am. Phys. Soc. 1, No. 2, 95, N2 (1956).

Levels $Cl^{(35)}(p,p')$ $E_p = 7.04$ s 90°, 130°

1.221 *5*	3.165* *8*
1.763 *5*	4.058 *5*
2.645 *5*	4.113 *5*
2.695 *5*	4.174 *5*
3.006 *5*	

No 0.7 level

*Energy shift also permits assignment to Cl^{37}

P.M.Endt, C.H.Paris, A.Sperduto, W.W.Buechner, Phys. Rev. 103, 961 (1956); Bull. Am. Phys. Soc. 1, No. 4, 223 W1 (1956).

Levels $Cl^{(35)}(n,n'\gamma)$ $E_n = 4.4$ scin

γ 1.23 *1*; 1.77 *1*

R.M.Sinclair, Westinghouse Research Report 60-94511-6-R12 (1956).

$Cl^{36}_{17\ 19}$ 3.1×10^5y β^- 0.714 4 4π scin

For $E_\beta > 0.089$ shape is fitted with ΔJ=2 no, $R_{ij}/T_{ij} = 0$ and $A_{ij}/T_{ij} = 14.2$

R.G.Johnson, O.E.Johnson, L.M.Langer, Phys. Rev. 102, 1142 (1956); Bull. Am. Phys. Soc. 1, No. 4, B1 162 (1956).

β^- 98.3% (0.714); ϵ_K 1.7% (K x ray + e_{AK})/β = 0.017 *1*; No γ (<10^{-2}%) CH_3Cl in pc scin, pc ce

R.W.P.Drever, A.Moljk, Phil. Mag. 46, 1337 (1955).

Cl^{36} 17 19

Levels $K^{(39)}(n,\alpha)$ E_n = 2.0 to 5.5
g.s. Q = 1.25 *20* KI scin
0.87 *10*

M.J.Scott, R.E.Segel, Phys. Rev. 102, 1557 (1956).

Levels $Cl^{(35)}(d,p)$ E_d = 3.0 to 7.5 s

g.s.	Q = 6.354 *8*		
0.790 *5*		**3.110** *8*	
1.163 *6*		**3.214** *8*	
1.600 *7*		**3.341** *8*	
2.473 *7*		**3.474** *8*	
2.498 *7*		**3.606** *8*	
2.523 *7*		**3.644** *8*	
2.684 *7*		**3.673** *8*	Cl^{38}?
2.820 *7*		**3.732** *8*	
2.872 *7*		**3.970** *8*	
2.905 *7*		**4.003** *8*	
3.004 *7*		**4.043** *8*	

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

Capture γ's $Cl^{(35)}$(th n,γ) scin Cp

10†	**0.48** *3*	34†	**1.96** *3*
10†	**0.75** *3*	1†	**2.42** *5*
8†	**1.14** *3*	6†	**2.84** *3*

Study covered E_γ = 0.3 to 3
†Photons/100 Cl captures, (± >20%)

T.H.Braid, Phys. Rev. 102, 1109 (1956); 90, 355A (1953).

Resonances $Cl^{(35)}$(n) E_n = 0.03 to 15000 ev

-140 ev	Γ_n = 0.72* ev	Γ_γ = 0.48*
405 *6*	Γ_n = 0.14§	
8700		cryst, chopper

*Assuming J = 2 §From Γ < 0.6 and σ_o > 580

R.M.Brugger, J.E.Evans, E.G.Joki, R.S. Shankland, Bull. Am. Phys. Soc. 1, No. 4, 176 F11 (1956); verbal report.

Cl^{37} 17 20

Levels $Cl^{(37)}(p,p')$ E_p = 7.04
0.838 *5* s 90°, 130°
1.728 *5*
3.087* *8*
3.105* *8*

*Energy shift also permits assignment to Cl^{35}

P.M.Endt, C.H.Paris, A.Sperduto, W.W.Buechner, Phys. Rev. 103, 961 (1956); Bull. Am. Phys. Soc. 1, No. 4, 223 W1 (1956).

Level $Cl^{37}(p,p')$ E_p = 4.6 to 5.6
1.713 *10* s77

J.P.Schiffer, C.R.Gossett, G.C.Phillips, T.E.Young, Phys. Rev. 103, 134 (1956); Bull. Am. Phys. Soc. 1, No. 2, 95, N2 (1956).

Cl^{38} 17 21

Levels $Cl^{(37)}(d,p)$ E_d = 3.0 to 7.5 s

43†	g.s.	Q = 3.877 *8*	
100†	**0.672** *5*	**1.620** *7*	
	0.762 *5*	**1.658** *7*	
	1.312 *6*	**1.693** *7*	

†Relative intensity for E_d = 5.6, compatible with $J = 2^-, 5^-$ for g.s., 0.672 levels resp.

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

Cl^{39} 17 22 56^m

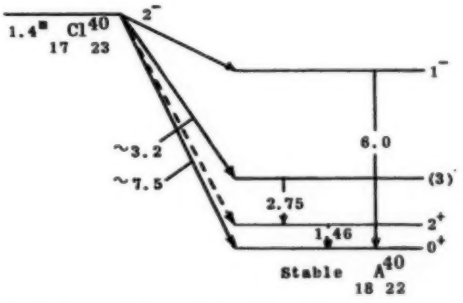
β^-	93.5%	**1.90** *5*	$A^{(40)}(\alpha,\alpha p)$; sl
	6.5%	**3.43** *5*	
$\gamma(A^{39})$	100†	**0.246**	scin
	100†	**1.266** *10*	
	84†	**1.520** *10*	

β(high E_γ) delay = 0.95$^{m\mu s}$ *5*
(0.246 γ)(1.27 γ) No (1.52 γ)γ

J.R.Penning, H.R.Maltrud, J.C.Hopkins, F.H. Schmidt, Bull. Am. Phys. Soc. 1, No. 4, 162 B2 (1956); verbal report.

Cl^{40} 17 23 1.4^m

τ		**1.4**^{m}	$A^{(40)}$(fast n,p) chem
β^-		~3.2	scin
		~7.5	
$\gamma(A^{40})$	100†	**1.46**	scin
	100†	**2.75**	
		6.0	



H.Morinaga, Phys. Rev. 103, 504 (1956); H.Morinaga, E.L.Robinson, E.Bleuler, Bull. Am. Phys. Soc. 1, No. 4, 162 B3 (1956).

A^{35} 18 17 1.8^s

$Cl^{(35)}$(10-Mev p,n) chem

τ		**1.83**^{S} *2*	
β^+	~93%	**4.96** *4*	sl
$\gamma(Cl^{35})$			
	≤3%	**1.19** *4*	scin
	≤3%	**1.73** *4*	

O.C.Kistner, A.Schwarzschild, B.M.Rustad, Bull. Am. Phys. Soc. 1, No. 1, 30, H3 (1956).

A^{37} 18 19 34^d

E_ϵ **0.812** *8* s Cl^{37} recoil
e_{AK} 65%
Charges 1 to 6 (av. = 2.6) found on recoils

Continued

A^{37} 18 19 34^{d} — Continued

Charge distribution and ϵ_L/ϵ_K value are discussed elsewhere*

O. Kofoed-Hansen, A. Nielsen, Kgl. Danske Videnskab. Selskab Mat-fys. Medd. 29, No. 15 (1955); Phys. Rev. 96, 1045 (1954). *A. Winther, J. phys. radium 16, 562 (1955); R. A. Rubenstein, J. N. Snyder, Phys. Rev. 99, 189 (1955); P. Benoist-Gueutal, Ann. Phys. 8, 593 (1953).

E_ϵ 0.814 2 s Cl^{37} recoil

Charges 1 to 7 (av. = 3.2) found on recoils

A. H. Snell, F. Pleasonton, Phys. Rev. 100, 1396; 98, 1174A; 97, 246 (1955).

ϵ scin γ continuum

High intensity of photons, $E_\gamma < 0.030$, supports theory of Glauber and Martin*

T. Lindqvist, C. S. Wu, Phys. Rev. 100, 145; 98, 231A (1955); *R. J. Glauber, P. C. Martin, Phys. Rev. 95, 572 (1954).

For $E_\gamma > 0.035$ γ continuum has allowed shape and intensity is 1.05 ± 0.25 times theoretical value

B. Saraf, Phys. Rev. 102, 466 (1956).

A^{39} 18 21 — Levels $K^{(39)}(n,p)$ $E_n = 2.0$ to 5.5

g.s.	(Q = 0.20)	KI scin
1.24 5		
2.46 10		

No 1.52 level (yield < 1/3 that of 1.24 level)

M. J. Scott, R. E. Segel, Phys. Rev. 102, 1557 (1956).

A^{41} 18 23 1.8^{h}

τ		1.8^{h}	$A^{(40)}$ (pile n,γ)
β^-	99.1%	1.199 8	F-K linear ($E_\beta > 0.15$)
	0.88%	2.48 4	$\Delta J = 2$, yes shape sl, sπ
$\gamma(K^{41})$		1.290 5	scin

A. Schwarzschild, B. M. Rustad, C. S. Wu, Bull. Am. Phys. Soc. 1, No. 1, 30, H4 (1956).

A^{41} 18 23 — Levels $A^{(40)}$(d,p) $E_d = 8.4$ s d,p(θ)

	Level	l_n
130†	g.s.	3
20†	0.57 5	1
w	1.11 10	
100†	1.39 5	1
w	1.93 10	
19†	2.46 5	1
17†	2.79 5	1
18†	3.01 5	1
28†	3.36 5	1
27†	3.98 5	1

† Relative values of $\int \sigma d\theta$

H. B. Burrows, T. S. Green, S. Hinds, R. Middleton, Proc. Phys. Soc. 69A, 310 (1956).

K 19 — Relative isotopic abundances ms

K^{39}	93.23%	5
K^{40}	0.0118%	2
K^{41}	6.76%	5

No K^{36}, K^{37}, K^{38} ($< 8 \times 10^{-6}$%)

No K^{42} ($< 4 \times 10^{-6}$%) No K^{43} ($< 2 \times 10^{-6}$%)

F. A. White, T. L. Collins, F. M. Rourke, Phys. Rev. 101, 1786 (1956).

K^{37} 19 18 1.2^{s}

τ		1.2^{s}	$Ca^{(40)}$(12.8-Mev p,α)
β^+		5.1	sπ

C. R. Sun, B. T. Wright, Bull. Am. Phys. Soc. 1, No. 5, 253 F8 (1956).

K^{38} 19 19 7.7^{m}

τ		7.7^{m} 3	$K^{(39)}$(18-Mev p,pn)
β^+		2.68 3	sl
No ce	No 4.9 β^+ (< 0.6%)		

D. Green, J. R. Richardson, Phys. Rev. 101, 776 (1956); 96, 858A (1954).

K^{39} 19 20 — Levels $A^{36}(\alpha,p)$ $E_\alpha = 7.4$

g.s.	Q = −1.28 3	ppl 90°
2.50		
2.87		

R. B. Schwartz, J. W. Corbett, W. W. Watson, Phys. Rev. 101, 1370 (1956); 99, 655A (1955).

$K^{(39)}(p,p')$ $E_p = 4.6$ to 5.6

No level below 2.0 sπ

J. P. Schiffer, C. R. Gossett, G. C. Phillips, T. E. Young, Phys. Rev. 103, 134 (1956).

K^{40} 19 21 1.3×10^{9y}

τ		1.28×10^{9y} 2	
$\gamma(A^{40})$		1.46 1	scin
27.5 3 β·s/sec g K			pc β
γ/β = 0.124 2		Co^{60} standard	pc β, scin γ
= 0.121 4		Na^{24} standard	

A. McNair, R. N. Glover, H. W. Wilson, Phil. Mag. 1, 199 (1956); Phys. Rev. 99, 771 (1955).

3.50 ± 0.14 γ's/sec gm K scin

Absolute count (Pr^{142}, Co^{60}, Fe^{59} standards)

G. Backenstoss, K. Goebel, Z. Naturf. 10a, 920 (1955).

ϵ/sec gm K = 3.24* 15

β/sec gm K = 27.6§ 30

*From A^{40}/K^{40} in 4 samples of micas of young Pb/U ages. Result insensitive to specific β activity of K^{40}

§From A^{40}/K^{40} in 8 samples of micas of older ages and above value of ϵ/sec gm K

G. W. Wetherill, G. J. Wasserburg, L. T. Aldrich, G. R. Tilton, R. J. Hayden, Phys. Rev. 103, 987 (1956); Bull. Am. Phys. Soc. 1, No. 1, 31, H5 (1956).

K^{40} 19 21

Capture γ's $K^{(39)}$(th n,γ) scin Cp

24†	**0.77** *3*	13†	**2.03** *3*
8†	**1.19** *3*	6†	**2.80** *3*
5†	**1.61** *3*	8†	**3.45** *5*

†Photons/100 K captures, ±20% (σ_a = 1.89)
(Max in K^{40}, K^{41}, K^{42} = 95.5, 0.4, 4.1†)

T.H.Braid, Phys. Rev. 102, 1109 (1956); 91, 442A (1953).

γ $Ca^{(40)}$(n,pγ) E_n = 3.95 scin

$\sigma(95°)$	E_γ
10 *5*	**0.030** *2*
5.8 *15*	**0.767** *7*
0.6 *3*	**0.877** *17*

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

K^{42} 19 23 12.5^h

β^-	1†	**0.5 ?**	K^{41}(pile n,γ); sl
	100†	**1.985** *10*	F-K linear
		3.545 *10*	$\Delta J = 2$, yes shape

$\gamma(Ca^{42})$

0.8††	**0.320** *5*	sl pe
100††	**1.53** *1*	

A.V.Pohm, R.C.Waddell, E.N.Jensen, Phys. Rev. 101, 1315 (1956).

K^{43} 19 24

Levels A^{40}(α,p) E_α = 7.4 ppl 90°

g.s.	Q = −3.36 *3*
0.65	
1.18	

R.B.Schwartz, J.W.Corbett, W.W.Watson, Phys. Rev. 101, 1370 (1956); 99, 655A (1955).

Ca^{40} 20 20

Levels $Ca^{(40)}$(p,p'γ) E_p = 6.54 to 8.15 sπ 90°

3.348 *4*	
3.730 *4*	**5.272** *6*
3.900 *4*	**5.606** *9*
4.483 *5*	**5.621** *8*
5.202 *8*	**5.901** *8*
5.241 *6*	**6.029** *8*

C.M.Braams, Phys. Rev. 101, 1764 (1956).

Levels $Ca^{(40)}$(n,n'γ) E_n = 3.95 scin

$\sigma(95°)$	
	3.36* *5*
γ 6 *2*	**3.74** *3*
3 *1*	**3.9** *1*

*Threshold for $\gamma^\pm$ σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Ca^{41} 20 21

Capture γ's $Ca^{(40)}$(th n,γ) scin Cp

15†	**0.48** *5*
45†	**1.93** *3*

Study covered E_γ = 0.3 to 3

Continued

Continued

†Photons/100 Ca captures, ± 20%

T.H.Braid, Phys. Rev. 102, 1109 (1956); 91, 442A (1953).

Ca^{44} 20 24

Level $Ca^{(44)}$(n,n'γ) E_n = 3.95 scin

$\sigma(95°)$	Level
γ 90 *20*	**1.152** *20*

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Ca^{47} 20 27 4.8^d

τ		**4.5**^{d}	$Ca^{(48)}$ (14-Mev p,pn) Ca^{46}(pile n,γ) chem
β^-	76%	**0.70** *2*	a $\beta\gamma$
	24%	**1.93** *20*	a
$\gamma(Sc^{47})$	5%	**0.500**	4π pc,scin
	5%	**0.812**	
	71%	**1.29**	

(0.70 β)(0.50, 0.81, 1.29 γ)
(0.50 γ)(0.81 γ) No (1.9 β)γ No γ(1.29 γ)

W.S.Lyon, T.H.Handley, Phys. Rev. 100, 1280 (1955).

Ca^{48} 20 28

$\tau_{\beta\beta}$		84.28% Ca^{48}; 4π scin
	> **2x10**^{18}y	$\beta\beta$
	> **1.1x10**^{18}y	β

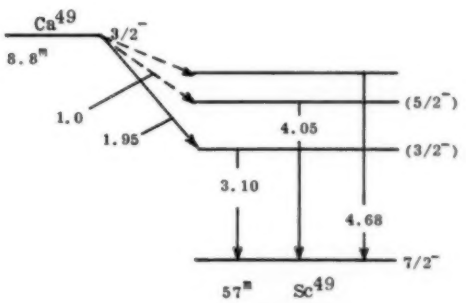
Search covered $3.0 < E_\beta < 4.75$
Long τ suggests ν and anti-ν are nonidentical

M.Awschalom, Phys. Rev. 101, 1041 (1956); Bull. Am. Phys. Soc. 1, No. 1, 31, H7 (1956).

Ca^{49} 20 29 8.8^m

τ		**8.75**^{m} *20*	Ca^{48}(pile n,γ)
β^-	14†	**0.89** *15*	scin
	100†	**1.95** *5*	
$\gamma(Sc^{49})$			
	100††	**3.10** *3*	scin
	11††	**4.05** *5*	
	0.38††	**4.68** *5*	

β/(3.10 γ) = 0.95 *10* 4π ic,scin
No (3.10 γ)(4.05, 4.68 γ) No 0.95γ (< 2†)



G.D.O'Kelley, N.H.Lazar, E.Eichler, Phys. Rev. 101, 1059 (1956).

Ca^{49} 20 29 8.8^{m}

τ	8.9^{m} 2	Ca^{48}(pile n,γ)	
β^-	~1.0		a$\beta\gamma$
	2.12 *10*		
$\gamma(Sc^{49})$ 85†	3.07 *5*		scin
10†	4.04 *6*		
0.8†	4.7 *1*		
(~1.0β)(4.04γ)	(2.12β)(3.07γ)		
No 5.2β (<1%)	No 0.98γ (<3†)		
No $\gamma\gamma$			

D.W.Martin, J.M.Cork, S.B.Burson, Phys. Rev. 102, 457 (1956); 100, 1236A (1955).

Sc 21

Relative isotopic abundances ms

Sc^{45} **100.0%**

No Sc^{42}, Sc^{43}, Sc^{44}, Sc^{46} (<0.010%)

P.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

Sc^{42} 21 21 0.6^{s}

τ	**0.62^{s}** 5	$K^{(39)}$(18-Mev α,n)	
β^+	**Several Mev**		scin

Yield too large for Ti^{43} production from Ca impurity. τ fits systematics for $0^+ \rightarrow 0^+$

H. Morinaga, Phys. Rev. 100, 431 (1955).

Sc^{44} 21 23 4.0^{h} g.s.

		$K^{(41)}$(19-Mev α,n) chem	
β^+ 93.2†	**1.471** 5		sl $\beta\gamma/\gamma$
		F-K linear (E_β>0.200)	
$\gamma(Ca^{44})$			scin
100†	**1.159** *3*	$\alpha = 6.3\times10^{-5}$	sl ce
0.12†	**2.54** *3*		
(1.47β)(1.16γ)			sl,scin

No 1.38γ ($\lesssim$0.5†)

Intensity of e's with E<0.15 compatible with value expected for atomic excitation

J.W.Blue, E.Bleuler, Phys. Rev. 100, 1324; 99, 659A (1955).

Sc^{44} 21 23 2.4^{d}

$\gamma(Sc^{44})$	**(0.271)**	α=0.139 *3*	sl ce,scin

J.W.Blue, E.Bleuler, Phys. Rev. 100, 1324; 99, 659A (1955).

Sc^{45} 21 24

Levels	Sc^{45}(n,n'γ)	E_n = 0.35 to 3.9	
γ	**0.36**	**0.97**	scin
	0.53	**1.23**	
	0.72	**1.41**	

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

Sc^{46} 21 25 84^{d} g.s.

β^- 0.003%*	**1.475** *6*	F-K not linear	sl

*Assuming $\alpha = 9.86\times10^{-5}$ for 1.12γ and shape factor $p^2+0.6q^2$

J.L.Wolfson, Can. J. Phys. 34, 256 (1956).

Sc^{46} 21 25 84^{d} g.s.

		Sc^{45}(slow n,γ)	
$\gamma(Ti^{46})$	**0.892** *3*		scin
	1.118 *3*		

K.E.Johansson, Arkiv Fysik 10, 247 (1956).

Sc^{45}(pile n,γ) chem

(1.12γ)(0.89γ)(θ) scin

Consistent with J=4, 2, 0

G.Bertolini, M.Bettoni, E.Lazzarini, Nuovo Cim. 3, 800 (1956).

Sc^{47} 21 26 3.4^{d}

		$Ti^{(48)}$(γ,p) chem	
β^- 64%	**0.430** 5		sl$\beta\gamma$
36%	**0.596** *10*		sl
$\gamma(Ti^{47})$	**0.167** 2		scin
(0.430β)γ	No ce		

R.T.Nichols, E.N.Jensen, Phys. Rev. 100, 1407 (1955).

Ca^{44}(23-Mev α,p) chem

β^- 60%	**0.439** 2		sl,scin
40%	**0.600** 2		
$\gamma(Ti^{47})$	**0.159** 2	$\beta\gamma$ delay<0.04$^{\mu s}$	
			sl pe,scin
(0.439β)γ	No (0.600β)γ		scin

W.E.Graves, S.K.Suri, Phys. Rev. 101, 1368 (1956).

Sc^{48} 21 27 1.8^{d}

$\beta\gamma$ delay<0.1$^{\mu s}$		$V^{(51)}$(d,αp) chem	
(1.04γ)(1.33γ)(θ)	J=6, 4, 2, 0		scin
(1.04γ)(0.99$\gamma\gamma$)(θ)			

B.Van Nooijen, P.Mostert, J.F.Van der Brugge, P.M.Endt, Physica 22, 194 (1956).

Sc^{49} 21 28 57^{m}

τ	**57.2^{m}** 7	$Ca^{(48)}$(pile n,$\gamma\beta$) chem	
β^- 100%	**2.05** 5		scin
No 1.35γ (<0.05%)		bremsstrahlung/β	
No other γ			

G.D.O'Kelley, N.H.Lazar, E.Eichler, Phys. Rev. 101, 1059 (1956).

β^- **1.8** *1* Ca^{48}(pile n,$\gamma\beta$); a

D.W.Martin, J.M.Cork, S.B.Burson, Phys. Rev. 102, 457 (1956).

Sc^{50} 21 29 1.7^{m}

τ	**1.74^{m}** 4	Ti^{50}(fast n,p)	
β^- ~1†	~3.5		scin
$\gamma(Ti^{50})$ ~1†	1.17		scin
1†	1.59		
(1.17γ)(1.59γ)			Σscin

H.Morinaga, E.Bleuler, Phys. Rev. 100, 1236A (1955); verbal report.

Ti 22

Capture γ's — Ti(th n,γ) — scin Cp

0.334 *6*	
1.39 *2*	
1.75 *4*	

Also unresolved γ's with $1.06 < E_\gamma < 1.10$ and $1.53 < E_\gamma < 1.58$

Study covered $E_\gamma = 0.1$ to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Ti^{45} 22 23

Level — Sc^{45}(p,n) $E_p = 2.9$ to 5.5; VdG — thresh n, ~0°

Level
g.s. Q = −2.844 *4*
0.743 *11*
1.194 *8*
1.347 *10*
1.460 *11*
1.876 *10*
2.016 *13*
2.430 *11*
2.555 *8*

Graph of σ(~0°) given for n yield

R.M.Brugger, T.W.Bonner, J.B.Marion, Phys. Rev. 100, 84 (1955).

Ti^{48} 22 26

Level — $Ti^{(48)}$(n,n′) — $E_n = 2.25$, 2.45 pulsed n's

$Ti^{(48)}$(n,n′γ)

σ(90°)	Level	
85* *3*	1.02 *3*	n,n′(θ), n,γ(θ)

Both angular distributions change with E_n

*For $E_n = 2.45$ — σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Ti^{49} 22 27

Capture γ's — $Ti^{(48)}$(th n,γ) — scin Cp

29†	0.33 *2*	
90†	1.40 *3*	
≤10†	~1.7	

Study covered $E_\gamma = 0.3$ to 3

†Photons/100 Ti captures, (±20%)

(Max in Ti^{47}, Ti^{48}, Ti^{49}, Ti^{50}, Ti^{51} = 0.7, 2.2, 95, 1.7, 0.3†)

T.H.Braid, Phys. Rev. 102, 1109 (1956); 90, 335A (1953).

V 23

Relative isotopic abundances — ms

V^{50}	0.25% *1*
V^{51}	99.75% *1*

No V^{48} (< 1×10^{-4}%) No V^{49} (< 5×10^{-5}%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

V^{48} 23 25 16^d

Fe(160-Mev p) chem — scin

(1.32 γ)(0.99 γ)(θ)
(2.23 γ)(0.99 γ)(θ)
(1.32 γ)(0.99 γ)(τ)
} J = 4, 4^+, 2^+, 0^+

J = 3, 4^+, 2^+, 0^+ cannot definitely be excluded

γ(0.99γ) delay < $20^{\mu\mu s}$

C.F.Coleman, Phys. Rev. 103, 647 (1956).

V^{50} 23 27 $>3 \times 10^{15}$y

τ_{ϵ_K} — $>5 \times 10^{13}$y — natural V

No Ti K x rays observed — pc

R.Bauminger, Bull. Research Council Israel 5A, 163A (1956).

V^{50} 23 27

Level — V^{50}(α,α′γ) — $E_\alpha = 4.4$

γ — 0.226 — ϵB(E2) = 0.011 — scin

L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

Level — V^{50}(α,α′γ) — $E_\alpha = 6.5$

γ — 0.225 — ϵB(E2) = 0.011 — scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

V^{51} 23 28

ground state

q — +0.28 *15* — S

K.Murakawa, J. Phys. Soc. Japan 11, 422 (1956).

Level — $V^{(51)}$(γ,γ) — Cr^{51} recoil

(0.320) — $\tau = 100^{\mu\mu s}$ *20* — σ

H.Schopper, Z.Phys. 144, 476 (1956).

Levels — $V^{(51)}$ (p,p′) — $E_p = 6.005, 7.420$ s 90°, 130°

0.322 *2*
0.931 *3*
1.614 *5*
1.819 *5*

No evidence for levels at 0.48, 1.16

W.W.Buechner, C.M.Braams, A.Sperduto, Phys. Rev. 100, 1387 (1955).

Levels — $V^{(51)}$(n,n′) — $E_n = 2.45$ pulsed n's

σ(90°)	Level	
16 *1*	0.92 *3*	
18 *2*	1.63 *3*	σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

γ — $V^{(51)}$(n,n′γ) — $E_n = 2.5$; scin

0.32 *2*	
0.48?	1.62 *4*
0.92 *4*	1.83 *4*

L.E.Beghian, D.Hicks, B.Milman, Phil. Mag. 1, 261 (1956).

V^{52} 23 29

Capture γ's — $V^{(51)}$(th n,γ) — scin Cp

5†	0.42 *3*	8†	0.84 *3*
6†	0.63 *3*	5†	2.25 *3*

Study covered $E_\gamma = 0.3$ to 3

†Photons/100 V captures, (±20%) ($\sigma_a = 4.7$)

(Max in V^{51}, V^{52} = 12, 88†)

T.H.Braid, Phys. Rev. 102, 1109 (1956).

V^{52} 23 29

Capture γ's $V^{(51)}$(th n,γ)

0.43 *2*		scin Cp
0.64 *2*		
~**0.82**	double?	

Study covered E_γ = 0.1 to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

V^{53} 23 30 1.7^m

τ		**1.7**^{m}	Cr^{53}(5.3-Mev n,p)
β^-		**2.53** *5*	scin
$\gamma(Cr^{53})$	st	**1.00** *1*	scin
	w	**1.29**	

A.W.Schardt, B.J.Dropesky, Bull. Am. Phys. Soc. 1, No. 4, 162 B4 (1956); verbal report.

V^{54} 23 31 55^s

τ		**55**^{s} *5*	Cr^{54}(16-Mev n,p)
β^-		**3.3** *2*	scin
$\gamma(Cr^{54})$		**0.835** *9*	**0.9** $<E_\gamma<$ **2.2** scin
		0.990 *10*	**2.25**

0.835 γ more intense than 0.990 γ

(0.835 γ)(0.990 γ)(E_γ > 1)

A.W.Schardt, B.J.Dropesky, Bull. Am. Phys. Soc. 1, No. 4, 162 B4 (1956); verbal report.

Cr 24

Levels Cr(n,n′) E_n = 4.3; scin

1.4	pulsed n's,90°
2.5	
2.9	
3.1 ?	

R.V.Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.

Level Cr(n,n′) E_n = 2.45

σ(90°)	Level	
48 *3*	**1.49** *3*	pulsed n's; σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Level Cr(n,n′γ) E_n = 2.5

σ = 0.6	**1.45** *5*	scin n
γ	**1.44** *3*	scin γ

L.E.Beghian, D.Hicks, B.Milman, Phil. Mag. 1, 261 (1956).

Capture γ's Cr(th n,γ) scin Cp

2†	**0.52** *3*		
40†	**0.83** *3*	10†	**2.28** *3*
6†	**1.84** *3*	4†	**3.04** *3*

Study covered E_γ = 0.3 to ~3

†Photons/100 Cr captures, ±20% (σ_a = 2.99)

(Max in Cr^{51}, Cr^{53}, Cr^{54}, Cr^{55} = 23, 20, 56, 0.2†)

T.H.Braid, Phys. Rev. 102, 1109 (1956); 91, 442A (1953).

Cr 24

Capture γ's Cr(th n,γ)

0.740 *20*		**1.07** *6*	scin Cp
0.815 *16*		**2.13** *5*	

Study covered E_γ = 0.1 to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Cr^{48} 24 24 24^h

τ		**23**^{h} *1*	Ni(380-Mev p) chem
$\gamma(V^{48})$	95†	**0.116** *2*	α = 0.02 M1 scin,
	100†	**0.305** *10*	α = 0.006 E2 sl ce
No β^+ (<2† from $\gamma^\pm$<1†)			scin
No 0.420 γ (<2†) No other γ			
(0.116 γ)(0.305 γ)		p $16^d V^{48}$	

R.van Lieshout, D.H.Greenberg, L.A.Ch.Koerts, C.S.Wu, Phys. Rev. 100, 223; 98, 1171 (1955).

Cr^{51} 24 27 27^d

E_ϵ **0.752** *22* scin γ continuum

J.B.Van der Kooi, H.J.Van den Bold, Physica 22, 681 (1956).

$Cr^{(50)}$(pile n, γ) chem

E_ϵ **0.780** *50* scin γ continuum

$\gamma(V^{51})$ 7% **(0.320)** (0.320 γ)/(γ continuum)

S.G.Cohen, S.Ofer, Phys. Rev. 100, 856 (1955).

$Cr^{(50)}$(pile n,γ) chem

E_ϵ (92.2%)	**0.756** *5*	γ continuum
$\gamma(V^{51})$		scin
9.8%	**(0.320)**	(0.320 γ)/(K x ray)
0.026%	**0.624** *5*	

A.Bisi, E.Germagnoli, L.Zappa, Nuovo. cim. 2, 1052 (1955).

$\gamma(V^{51})$ **(0.320)** α = 0.0031 *2* E2 GM

I.V.Estulin, E.M.Moiseeva, Soviet Phys. JETP 1, 463 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 541 (1955).

$\gamma(V^{51})$ **0.325** α = 0.0015 *2* sl ce,Cp

Z.O'Friel, A.H.Weber, Phys. Rev. 101, 1076 (1956).

$\gamma(V^{51})$ 9.8% **(0.323)** α = 0.00162 *16* scin,

$K\gamma/K$ = 0.098 *6* M1 + E2 sl ce

M.E.Bunker, J.W.Starner, Phys. Rev. 97, 1272 (1955); 99, 1906 (1955).

Cr^{52} 24 28

Levels $Cr^{(52)}$(n,n′) E_n = 4.4

37†	**g.s.**	ppl p-recoil
14†	**(1.45)**	
~5†	**(2.43)**	
~14†	**(3.13)**	

†σ(90°) in mb/sterad

J.B.Weddell, B.Jennings, Bull. Am. Phys. Soc. 1, No. 1, 55, R5 (1956); verbal report.

$Cr^{52}_{24\ 28}$ Resonance peaks $V^{51}(p,n)$ $E_p = 1.55$ to 1.65

E_o [$]	E_o [$]
1.568*	1.629*
1.573*	1.637*
1.575	1.651
1.592**	1.658*
1.598**	1.669*
1.603*	1.672
1.607*	
1.617*	

Threshold = 1.5656 *15*

*p,n(θ) isotropic **p,n(θ) anisotropic

[$] E_p values for isolated resonances

J.H.Gibbons, R.L.Macklin, H.W.Schmitt, Phys. Rev. 100, 167 (1955).

$Cr^{53}_{24\ 29}$ Levels $Cr^{52}(d,p)$ $E_d = 10$ a pc

Level	l_n		
g.s.	1	Q = 5.74	d,p(θ)
0.57	1		
0.97	3		
2.31	1		

A.J.Elwyn, F.B.Shull, Bull. Am. Phys. Soc. 1, No. 6, 281 B7 (1956).

Resonance peaks $Cr^{(52)}(n,n)$ Li(p,n); n,n(θ)

0.058 J = $1/2^+$ l_n = 0

0.100 = $1/2^+$ = 0

R.C.Block, H.W.Newson, Bull. Am. Phys. Soc. 1, No. 1, 55, R3 (1956).

$Cr^{54}_{24\ 30}$ Levels $Cr^{53}(d,p)$ $E_d = 10$ a pc

Level	l_n		
g.s.	1	Q = 7.55	d,p(θ)
0.86	1		
1.31	1		
2.67	1		
3.19	1		
3.79	1		

A.J.Elwyn, F.B.Shull, Bull. Am. Phys. Soc. 1, No. 6, 281 B7 (1956).

$Cr^{55}_{24\ 31}$ 3.5^m No γ (< 0.01%) $Cr^{54}(n,\gamma)$

T.H.Handley, S.A.Reynolds, CF-56-3-65; Nuclear Sci. Abstr. 10, No. 3243 (1956).

Mn 25 Relative isotopic abundances ms

Mn^{55} 100.0%

No Mn^{53} (< 4×10^{-4}%) No Mn^{54} (< 3×10^{-4}%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

$Mn^{52}_{25\ 27}$ 5.7^d g.s. (0.73 γ)(θ,T), (0.94 γ)(θ,T), (1.46 γ)(θ,T) } J = 6, 4, 2, 0 scin

W.J.Huiskamp, M.J.Steenland, A.R.Miedema, H.A.Tolhoek, C.J.Gorter, Physica 22, 587 (1956).

$Mn^{52}_{25\ 27}$ 21^m β^+ 2.631 *15* F-K linear $8.3^h Fe^{52}$ source sd

E.Arbman, N.Svartholm, Arkiv. Fysik 10, 1 (1956).

$Mn^{54}_{25\ 29}$ 291^d g.s. E_ϵ 0.528 *20* x(continuum γ)

R.G.Jung, M.L.Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).

$Mn^{54}_{25\ 29}$ Mn^{55}(≤ 24-Mev γ,n) No 2.1^m activity ($\int \sigma dE < 0.1$ mb Mev)

J.Goldemberg, Acad. Brasileira Ciencias 27, LIV (1955).

$Mn^{55}_{25\ 30}$ Level $Mn^{55}(\alpha,\alpha'\gamma)$ $E_\alpha = 3$

0.128 level J = $7/2^-$ p,γ(θ)

γ (0.128) α_K = 0.0144* *30* s ce

M1 (≳ 98%)

*From (α_K 0.137 γ Ta^{181})/(α_K 0.128 γ Mn^{55}) = 125 *25*

E.M.Bernstein, H.W.Lewis, Phys. Rev. 100, 1367 (1955).

Level $Mn^{55}(n,n'\gamma)$ E_n = 0.13 to 2

γ (0.128) scin γ

Graph of σ from threshold < E_n < 2

Hanser-Feshbach theory for σ favors J = $9/2^-$

J.B.Guernsey, A.Wattenberg, Phys. Rev. 101, 1516 (1956).

γ $Mn^{55}(n,n'\gamma)$ E_n = 0.2 to 1.2

(0.128)* scin γ

0.84 4

*Hauser-Feshbach theory for σ favors J = $7/2^-$

J.J.Van Loef, D.A.Lind, Phys. Rev. 101, 103 (1956); 99, 621A; 98, 224A (1955).

Levels $Mn^{55}(n,n'\gamma)$ E_n = 2.5

σ = 0.4	0.94 5		scin n
0.3	1.37 5		
0.1	1.65 5		
γ	0.126 5		scin γ
	0.32 2	1.53 3	
	0.86 3	1.87?	
	1.21 3	2.27 4	

(0.126 γ)(0.86, 1.21, 1.53, 2.27 γ) scin

No (0.126 γ)(1.87 γ)

L.E.Beghian, D.Hicks, B.Milman, Phil. Mag. 1, 261 (1956).

Levels $Mn^{55}(n,n')$ E_n = 2.45

σ(90°)	Level	
20 2	0.98 4	pulsed n's
11 1	1.29 3	
12 2	1.53 3	σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

$^{Mn^{56}}_{25\ 31}$ 2.6^h

$\gamma(Fe^{56})$ **0.845** *6* **1.809** *9* **2.134** *11* Mn^{55}(th n,γ); scin

M.G.Muñoz, D.Maeder, Helv. Phys. Acta 28, 359A (1955).

$^{Mn^{56}}_{25\ 31}$

Capture γ's Mn^{55}(th n,γ) scin Cp

0.098 *5* **0.206** *10* **0.266** *15* **0.308** *15*

Study covered E_γ = 0.1 to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Resonances Mn^{55}(n) E_n = 0.175 to 10 kev chopper

σ(peak)	E_o(kev)	Γ(ev)	J
2830	**0.337** *3*	21.5	2
	1.08 *2*	14.4	3
702	**2.36** *6*	340	3
	7.50		

Γ_γ assumed to be 0.6 ev

L.M.Bollinger, D.A.Dahlberg, R.R.Palmer, G.E.Thomas, Phys. Rev. 100, 126 (1955); 95, 645A (1954).

$^{Fe}_{26}$ Levels Fe(n,n') E_n = 4.3; scin pulsed n's

g.s. **0.8** **2.2** **3.1**

R.V.Smith, Bull. Am. Phys. Soc. 1, No. 1, 55, R6 (1956); verbal report.

Capture γ's Fe(th n,γ) scin Cp

0.355 *8*

Also unresolved γ's with $1.55 < E_\gamma < 1.68$

Study covered E_γ = 0.1 to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

γ Fe(n,n'γ) E_n = 2.56 scin

σ(95°)	E_γ
1.0 *2*	**0.123** *1*
68 *5*	**0.847** *8*
3.3 *4*	**1.241** *12*
3.7 *4*	**1.405** *10*
0.4 *1*	**2.18** *6*
0.2 *1*	**2.3** *1*

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

γ Fe(n,n'γ) E_n = 3.7 scin

σ(100°)	E_γ
135 *27*	**0.84** *2*
24 *5*	**1.25** *2*
25 *5*	**1.81** *2*
30 *6*	**2.06** *2*
7 *1*	**2.57** *2*
14 *3*	**3.07** *2*
21 *4*	**3.44** *2*

σ units: mb/sterad

I.L.Morgan, Phys. Rev. 103, 1031 (1956).

$^{Fe}_{26}$ Resonance peaks Fe(n) Li(p,n)

	E_o(kev)	I_n		E_o(kev)	I_n
st	**8.0**		w	**36 ?**	
w	**16 ?**		st	**74.5**	0
st	**28.8**	0	st	**84.5**	0

J.H.Gibbons, Phys. Rev. 102, 1574 (1956).

$^{Fe^{52}}_{26\ 26}$ 8.3^h

β^+ **0.804** *10* Ni(160-Mev p) chem P-K linear sd

$\epsilon/\beta^+ = 0.8\ 2$ from $\beta^+(Fe^{52})/\beta^+(21^m Mn^{52}) = 0.57\ 6$ assuming 100% of Fe^{52} decays to $21^m Mn^{52}$

E.Arbman, N.Svartholm, Arkiv Fysik 10, 1 (1956).

$^{Fe^{54}}_{26\ 28}$ Levels $Fe^{(54)}(p,p')$ E_p = 7.04 sd; 30°,130°

1.41 **2.54** **2.57** **3.16** **3.34**

W.W.Buechner, A.Sperduto, Bull. Am. Phys. Soc. 1, No. 1, 39, JA3 (1956).

Level $Fe^{(54)}(n,n'\gamma)$ E_n = 2.56 scin

σ(95°)	Level
63 *7*	**1.405** *10*

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

$^{Fe^{55}}_{26\ 29}$ 2.9^y

For $E_\gamma > 0.1$ γ continuum has allowed shape and intensity is 1.10 ±0.25 times theoretical value

B.Saraf, Phys. Rev. 102, 466 (1956).

$^{Fe^{55}}_{26\ 29}$ Levels Fe^{54}(d,p) E_d = 6.54, 7.01 s; 10°,45°

g.s. Q = 7.073 **0.413** **0.932** **1.413**

Many levels observed between 1.30 and 7.60

A.Sperduto, W.W.Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4, 311 (1956).

Levels Mn^{55}(p,n) E_p = 1.7 to 3.9 thresh n, ~0°

0.925 *5* **1.327** *9* **2.165** *15*

R.A.Chapman, J.B.Marion, J.C.Slattery, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956); verbal report.

$^{Fe^{56}}_{26\ 30}$ Levels $Fe^{(56)}(n,n')$ E_n = 6.5 ppl p-recoil

13†	**g.s.**
6†	**0.85**
3†	**2.09**

†$\sigma(90°)$ in mb/sterad

J.B.Weddell, B.Jennings, Bull. Am. Phys. Soc. 1, No. 1, 55, R5 (1956); verbal report.

$Fe^{56}_{26\ 30}$

Levels $Fe^{(56)}(p,p')$ $E_p = 7.04$

0.85		sd; 30°, 130°
2.08	**3.12**	
2.66	**3.37**	
2.94	**3.45**	
2.96	**3.60**	

W. W. Buechner, A. Sperduto, Bull. Am. Phys. Soc. 1, No. 1, 39, JA3 (1956); verbal report.

Level $Fe^{(56)}(n,n')$ $E_n = 2.25, 2.45$ $Fe^{(56)}(n,n'\gamma)$ pulsed n's

$\sigma(90°)$*	Level	
85 *3*	**0.86** *3*	$n,n'(\theta)$, $n,\gamma(\theta)$

Both angular distributions change with E_n

* For $E_n = 2.45$ σ units: mb/sterad

L. Cranberg, J. S. Levin, Phys. Rev. 103, 343 (1956); 100, 434 (1955); Bull. Am. Phys. Soc. 1, No. 1, 56 R10 (1956).

γ $Fe^{(56)}(n,n'\gamma)$ $E_n = 3.7$; scin

0.845 *10*	$\sigma(90°) = 135$mb/sterad
1.23 *1*	
1.80 *2*	$\sigma(90°) = 24$mb/sterad
2.10 *3*	

W. A. Rothman, H. S. Hans, C. E. Mandeville, Phys. Rev. 100, 83 (1955).

γ $Fe^{(56)}(n,n'\gamma)$ $E_n = 2.56$

$\sigma(95°)$	E_γ	
74 *6*	**0.847** *8*	scin
3.7 *4*	**1.241** *12*	σ units: mb/sterad

R. B. Day, Phys. Rev. 102, 767 (1956).

γ $Fe^{(56)}(n,n'\gamma)$ $E_n = 3.7$

$\sigma(100°)$	E_γ	
150 *30*	**0.84** *2*	scin
26 *5*	**1.25** *2*	σ units: mb/sterad

I. L. Morgan, Phys. Rev. 103, 1031 (1956).

$Fe^{57}_{26\ 31}$

Levels $Fe^{56}(d,p)$ $E_d = 6.54, 7.01$

g.s.	Q = 5.418	s; 10°, 45°
0.015		
0.135		
0.365		

Many levels observed between 0.36 and 6.5

A. Sperduto, W. W. Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4 (1956).

Level $Fe^{(57)}(p,p')$ $E_p = 7.04$

0.36	sd; 30°, 130°

W. W. Buechner, A. Sperduto, Bull. Am. Phys. Soc. 1, No. 1, 39, JA3 (1956); verbal report.

$Fe^{57}_{26\ 31}$

γ $Fe^{(57)}(n,n'\gamma)$ $E_n = 2.56$

$\sigma(95°)$	E_γ	
43 *7*	**0.123** *1*	scin
		σ units: mb/sterad

R. B. Day, Phys. Rev. 102, 767 (1956).

$Fe^{58}_{26\ 32}$

Levels $Fe^{57}(d,p)$ $E_d = 6.54, 7.01$

g.s.	Q = 7.808	s; 10°, 45°
0.799		
1.664		
2.125		

Many levels observed between 2.04 and 8.30

A. Sperduto, W. W. Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4, 311(1956).

$Fe^{59}_{26\ 33\ 45^d}$

$\gamma(Co^{59})$

100†	**1.100**	s?? Cp
77†	**1.278**	

B. S. Dželepov, J. V. Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956); Doklady Akad. Nauk SSSR 86, 497 (1952).

$Fe^{59}_{26\ 33}$

Levels $Fe^{58}(d,p)$ $E_d = 6.54, 7.01$

g.s.	Q = 4.350	s; 10°, 45°
0.286		
0.473		
0.728		

Many levels observed between 0.73 and 6.20

A. Sperduto, W. W. Buechner, Bull. Am. Phys. Soc. 1, No. 4, 223 W4 (1956).

$Co^{56}_{27\ 29}$

ground state

J	**4**	para
$\lvert\mu\rvert$	**3.848** *15*	
$\lvert\mu(Co^{56})/\mu(Co^{59})\rvert$	= 0.828 *3*	

J. M. Baker, B. Bleaney, P. M. Llewellyn, P. F. D. Shaw, Proc. Phys. Soc. 69A, 353 (1956).

ground state

J	**4**	para
$\lvert\mu\rvert$	**3.855** *7*	
$\lvert\mu(Co^{56})/\mu(Co^{59})\rvert$	= 0.830 *2*	

R. V. Jones, W. Dobrowolski, C. D. Jeffries, Phys. Rev. 102, 738 (1956).

ground state

$\lvert\mu\rvert$ **2.6** *2* from $\lvert g\rvert = 0.66$ *4* $\gamma(\theta,T)$

R. C. Sapp, C. M. Schroeder, Bull. Am. Phys. Soc. 1, No. 2, 91, L1 (1956).

Co^{56} 27 29 77d

β^+ 1.47 *3* sl

$\gamma(Fe^{56})$				scin
100†	0.845	15†	2.02	
			2.06	
10†	1.03 ?	20†	2.6	
65†	1.24	2†	2.99	
20†	1.75	15†	3.25	

No 0.440, 0.977 β (<2% of 1.47 β)

J.D.Kurbatov, H.J.Sathoff, Jr., K.Hisatake, M.Sakai, Bull. Am. Phys. Soc. 1, No. 4, 162 B5 (1956); verbal report.

$\gamma(Fe^{56})$				$Fe^{(56)}$(p,n) scin
100†	0.85			
76†	1.20	19.8†	2.55	
18†	1.71	1.6†	~3.0	
13†	2.00	14†	3.25	

$(0.85\gamma)/\beta^+ = 3.8$

C.S.Cook, F.M.Tomnovec, Bull. Am. Phys. Soc. 1, No. 1, 31, H8 (1956); verbal report

Co^{57} 27 30

ground state

J 7/2 para

$|\mu|$ 4.65 *5*

$|\mu(Co^{57})/\mu(Co^{59})| = 1.00$ *1*

J.M.Baker, B.Bleaney, P.M.Llewellyn, P.F.D. Shaw, Proc. Phys. Soc. 69A, 353 (1956); 66A, 305 (1953).

Co^{57} 27 30 270d

E_ϵ 0.434 *30* x(continuum γ)

R.G.Jung, M.L.Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).

No β^+ (<0.1%) d 36^hNi; scin

$(0.123\gamma)(0.014\gamma)$ delay = $101^{m\mu s}$ *5*

W.C.Middelkoop, A.Heyligers, L.H.Th.Rietjens, H.J.Van den Bold, P.M.Endt, Physica 21, 897 (1955).

$\gamma(Fe^{57})$		$Fe^{(56)}$(d,n) chem K/L	L/M	sd ce
1*	0.01437 *1*	8.93	9.1	
49.6*	0.12194 *3*	6.7		
	0.13631 *3*	8.2		

*Relative ce_K intensity

J.Bellicard, A.Moussa, Compt. rend. 241, 1202 (1955).

$\gamma(Fe^{57})$ $Fe^{(56)}$(18-Mev d,n) chem

No 0.029γ (<3% of 0.0144γ) pc

No other γ with $0.009 < E_\gamma < 0.048$

M.A.Grace, G.A.Jones, J.O.Newton, Phil. Mag. 1, 363 (1956).

Co^{58} 27 31 72d g.s.

$\gamma(Fe^{58})$ 0.805 $Ni^{(58)}$(fast n,p)

$\beta^+/0.805\gamma = 0.130$ *13* scin $\gamma^\pm/\gamma$

(K x ray)(0.805γ) pc, scin

No 0.50γ

M.A.Grace, G.A.Jones, J.O.Newton, Phil. Mag. 1, 363 (1956).

$\gamma(Fe^{58})$				$Mn^{55}(\alpha,n)$ chem
1.6†	(0.81)*	E2/M1 = 4.8 *13*		$\gamma\gamma(\theta)$
100†	0.814* *10*			scin
0.5†	1.62 *2*			

$(0.81\gamma)(0.814\gamma)(\theta)$ J = 2, 2, 0

*$\Delta E < 0.010$ No 0.50γ scin $\gamma\gamma$

H.Frauenfelder, N.Levine, A.Rossi, S.Singer, Phys. Rev. 103, 352 (1956); Bull. Am. Phys. Soc. 1, No. 4, 163 B6 (1956).

$\gamma(Fe^{58})$		$Ni^{(58)}$(pile n,p) chem
100†	(0.81)	scin
0.5†	1.64 *4*	

B.L.Robinson, R.W.Fink, Bull. Am. Phys. Soc. 1, No. 1, 40, JA7 (1956); verbal report.

Co^{59} 27 32

Levels $Co^{59}(n,n')$ $E_n = 2.45$ pulsed n's

$\sigma(90°)$	Level
38 *5*	1.20 *3*
34 *4*	1.51 *2*
12 *2*	1.75 *2*

σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Levels $Co^{59}(n,n')$ $E_n = 4.3$; scin pulsed n's, 90°

1.2

1.8

3.1

R.V.Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.

Co^{60} 27 33

ground state

J 5 Co^{59}(pile n,γ); para

$|\mu|$ 3.800 *7*

W.Dobrowolski, R.V.Jones, C.D.Jeffries, Phys. Rev. 101, 1001 (1956).

ground state

μ positive

From circular polarization of γ's from polarized Co^{60}

J.C.Wheatley, W.J.Huiskamp, A.N.Diddens, M.J.Steenland, H.A.Tolhoek, Physica 21, 841 (1955).

Co^{60} 27 33 — 5.2^{y} g.s.

τ	5.20^{y} 3	(1)
	5.25 4	(2)
	5.27 7	(3)

(1) E.E.Lockett, R.H.Thomas, Nucleonics 14, No. 11, 127 (1956); 11, No. 3, 14 (1953). Previous value of 4.95^{y} retracted.

(2) W.E.Perry, J.W.Dale, quoted by ref. 1.

(3) J.Tobailem, Ann. Phys. 10, 783 (1955); Compt. rend. 233, 1360 (1951).

β^-	0.01%*	1.478 6	$\Delta J = 3$, no shape sl

*Assuming $\alpha = 1.32 \times 10^{-4}$ for 1.33 γ

J.L.Wolfson, Can. J. Phys. 34, 256 (1956).

$\gamma(Ni^{60})$		Co^{59}(pile n,γ) chem
0.0012%	2.158	sd pe

J.L.Wolfson, Can. J. Phys. 33, 886 (1955).

Co^{60} 27 33

Capture γ's — Co^{59}(th n,γ) scin Cp

0.237 5	
0.289 10	0.82 2
0.43?	1.48 4
0.65 2	1.82 4

Study covered E_γ = 0.1 to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Co^{61} 27 34 — 1.7^{h}

τ	1.66^{h} 1	
β^-	95 ± 15% 1.220 40	scin

No γ with $0.40 < E_\gamma < 0.66$ (< 0.5%)

R.H.Nussbaum, A.H.Wapstra, W.A.Bruil, M.J. Sterk, G.J.Nijgh, N.Grobben, Phys. Rev. 101, 905 (1956).

$Cu^{(65)}$(31.5-Mev γ,α) chem

τ	1.75^{h} 15	
$\gamma(Ni^{61})$	0.072 3	scin
$\gamma/\beta^- \sim 1$	No 0.50 γ (< 5%)	No other γ

P.Erdös, P.Jordan, D.Maeder, P.Stoll, Helv. Phys. Acta 28, 323A (1955).

Ni 28 — Levels — Ni(n,n') Ni(n,n'γ) E_n = 2.45 pulsed n's

$\sigma(90°)$	Level	
52 3	{(1.33) (1.45)}	n,n'(θ), n,γ(θ)

σ units: mb/sterad

Angular distributions differ from those for similar reactions on Ti^{48} and Fe^{56}

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Ni 28 — Levels — Ni(n,n') E_n = 4.3; scin pulsed n's, 90°

1.4
2.1
2.5
2.9

R.V.Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.

Ni^{58} 28 30 — Levels — $Ni^{(58)}$(p,p') E_p = 4.580, 5.283

1.153* 10	2.275* 10 sπ
1.453 5	2.776* 10

*Assignment uncertain; calculation of energy based on A = 58

R.R.Spencer, G.C.Phillips, J.P.Schiffer, T.E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, M13 (1956); verbal report.

Level — $Ni^{(58)}$(p,p'γ) E_p = 2.5 to 4.5
γ (1.45) $\tau < 0.2^{\mu\mu s}$ scin

M.S.Moore, J.P.Schiffer, C.M.Class, Bull. Am. Phys. Soc. 1, No. 1, 39, JA4 (1956); verbal report.

Level — $Ni^{(58)}$(n,n'γ) E_n = 2.56 scin

$\sigma(95°)$	Level
45 4	1.453 14

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

γ — Ni^{58}(n,n'γ) E_n = 4.4 scin

33†	1.01 1
100†	1.46 2

R.M.Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42 K3 (1956).

Ni^{59} 28 31 — 7.5x10^{4y}

$\tau_{\epsilon K}$	10.0x10^{4y} 25	Ni^{58}(pile n,γ)

γ continuum has forbidden shape scin
τ from specific K x ray activity

B.Saraf, Phys. Rev. 102, 466 (1956).

Ni^{59} 28 31 — Levels — Co^{59}(p,n)

0.345	1.79	thresh n
0.44	1.98	
1.22	2.15	
1.36	2.55	
1.58	2.65	

J.W.Butler, C.R.Gossett, H.D.Holmgren, Bull. Am. Phys. Soc. 1, No. 4, 163 B8 (1956); verbal report.

Capture γ's — $Ni^{(58)}$(th n,γ) scin Cp

8†	0.45 3		
3†	0.86 3	3†	2.06 3
2†	1.24 3	2†	2.68 3

Study covered E_γ = 0.3 to 3
†Photon /100 Ni captures, (±20%) (σ_a = 4.5)
(Max in Ni^{59}, Ni^{61}, Ni^{62}, Ni^{63}, Ni^{65} = 71, 15, 0.6, 13, 0.5†)

T.H.Braid, Phys. Rev. 102, 1109 (1956).

$Ni^{60}_{28\ 32}$

Levels $Ni^{(60)}(\gamma,\gamma)$ $5.2^{y}Co^{60}$ γ

g.s.	J = 0		scin $\gamma,\gamma(\theta)$
(1.33)	J = 2		
	$\tau = 0.8^{\mu\mu s}$ 2	(half-life)	

τ from Γ determined from self-absorption of resonance radiation

F.R.Metzger, Phys. Rev. 103, 983 (1956); Bull. Am. Phys. Soc. 1, No. 1, 40 JA6 (1956).

Levels $Ni^{(60)}(p,p')$ $E_p = 4.580, 5.283$

1.330 5	s??
2.156 10	

R.R.Spencer, G.C.Phillips, J.P.Schiffer, T.E. Young, Bull. Am. Phys. Soc. 1, No. 2, 95, M13 (1956); verbal report.

γ $Ni^{(60)}(n,n'\gamma)$ $E_n = 2.56$

$\sigma(95°)$	E_γ	
17 3	0.827 8	scin
55 6	1.329 10	
5 2	2.18 4	σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Resonances $Co^{59}(p,\gamma)$ $E_p = 1.0$ to 1.9

150 resonances observed for $E_\gamma \geq 4$

g.s. γ not observed ($<5\%$ of γ to 1.33 level)

C.R.Gossett, J.W.Butler, H.D.Holmgren, Bull. Am. Phys. Soc. 1, No. 4, 223 W5 (1956); verbal report.

$Ni^{61}_{28\ 33}$

Levels $Ni^{61}(\alpha,\alpha'\gamma)$ $E_\alpha = 4.4$

γ	0.066	$\epsilon B(E2) = 0.00038$	scin
	0.282	$= 0.00090$	
	0.657	$= 0.0090$	

L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$Ni^{66}_{28\ 38}$ 55^{h}

τ	54.8^{h} 3	U(170-Mev p,f)	chem
β^-	~0.15		a

A.Kjelberg, A.C.Pappas, Nuclear Phys. 1, 322 (1956).

τ	55.1^{h} 10	U(340-Mev p,f)	chem
β^-	0.20 3	F-K linear	scin
No γ (<0.1 of Cu^{66} 1.03γ)			scin

N.R.Johnson, R.K.Sheline, R.Wolfgang, Phys. Rev. 102, 831 (1956).

Cu 29

Levels Cu(n,n') $E_n = 2.45$ pulsed n's

$\sigma(90°)$	Level	
38 5	0.98 4	
32 6	1.46 3	
13 3	1.62 3	
9 2	1.74 2	
7 2	1.90 2	σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Cu 29

Capture γ's Cu(th n,γ) scin Cp

0.202 10
0.280 10

Study covered $E_\gamma = 0.1$ to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

γ Cu(n,n'γ) $E_n = 2.56$

$\sigma(95°)$	E_γ	$\sigma(95°)$	E_γ	scin
4 1	0.365 5	5 2	1.41 3	
6 1	0.651 6	2 1	1.47 3	
4 1	0.764 10	4 1	1.55 3	
29 4	0.958 10	2 1	1.88 4	
13 2	1.110 10	3 1	2.07 2	
9 1	1.325 10	<0.3	2.52 3	

σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

γ Cu(n,n'γ) $E_n = 3.7$ scin

0.68 2	1.32 2
0.97 2	1.90 2
1.10 2	2.60 2

I.L.Morgan, Phys. Rev. 103, 1031 (1956).

$Cu^{59}_{29\ 30}$ 81^{s}

τ	81^{s} 1	$Ni^{(58)}$(4-Mev d,n)	
β^+ 100†	3.70 10		s
$\gamma(Ni^{59})$	10†	1.28 2	scin
~3†	0.33 2	1.8† 1.67 4	
11†	0.865 15	~0.3† 2.07 5	

$\gamma^{\pm}$(0.33, 0.865, 1.28γ)

No (0.865γ)(1.28γ)

F.W.Prosser, Jr., M.S.Moore, J.P.Schiffer, Bull. Am. Phys. Soc. 1, No. 4, 163 B7 (1956); verbal report.

β^+	3.7	$Ni^{(58)}$(~4-Mev p,γ);	s

M.S.Moore, J.P.Schiffer, C.M.Class, Bull. Am. Phys. Soc. 1, No. 1, 39, JA4 (1956); verbal report.

Ni^{58}(5.5-Mev d,n)

β^+	≥95%	GM
ϵ	≤5%	pc (K x ray)/β^+~0.015
No γ with $0.08 < E_\gamma < 0.50$	($<0.5\%$ of β^+)	scin

T.Yuasa, G.A.Renard, J. phys. radium, 16, 889 (1955).

$\gamma(Ni^{59})$	0.19 ?	Ni^{58}(1.84-Mev p,γ)	
	0.35	1.31	scin
	0.87	1.80	

J.W.Butler, C.R.Gossett, H.D.Holmgren, Bull. Am. Phys. Soc. 1, No. 4, 163 B8 (1956).

Cu^{59} 29 30

Resonance peaks	$Ni^{58}(p,\gamma)$	E_p = 0.6 to 1.8 scin, Cu^{59} $\gamma^{\pm}$
	0.855	
	0.947	
	1.009	1.375
	1.099	1.423
	1.226	1.521
	1.307	1.539
	1.315	1.581

C.R. Gossett, J.W. Butler, H.D. Holmgren, Bull. Am. Phys. Soc. 1, No. 1, 40, JA5 (1956).

Cu^{61} 29 32 3.3^h

β^+	3†	0.560			sl
	5†	0.940			
	~2†	1.150			scin $\beta\gamma$
	51†	1.220 *15*			sl
$\gamma(Ni^{61})$	4†	0.070 *1*	11†	0.660 *10*	scin
	12†	0.280 *3*	1.5†	0.940 *50*	
	2.5†	0.380 *10*	1†	1.150 *50*	
	1.5†	0.580 *20*	5†	1.220 *50*	

R.H. Nussbaum, A.H. Wapstra, W.A. Bruil, M.J. Sterk, G.J. Nijgh, N. Grobben, Phys. Rev. 101, 905 (1956).

Cu^{61} 29 32

Resonance peaks	$Ni^{60}(p,\gamma)$		E_p = 0.6 to 1.8	
	0.725	1.247	1.431	scin
	0.895	1.313	1.451	
	1.029	1.319	1.461	
	1.066	1.323	1.465	
	1.078	1.331	1.483	1.567
	1.132	1.343	1.491	1.578
	1.167	1.347	1.515	1.589
	1.197	1.371	1.519	1.600
	1.209	1.381	1.529	1.607
	1.239	1.415	1.539	1.620

Γ< 1 kev for all peaks

C.R. Gossett, J.W. Butler, H.D. Holmgren, Bull. Am. Phys. Soc. 1, No. 1, 40, JA5 (1956).

Cu^{63} 29 34

Levels	$Cu^{63}(n,n'\gamma)$				E_n = 4.4
γ 40†	0.65 *1*	60†	1.34 *3*	scin
100†	0.97 *1*	20†	1.43 *5*	

R.M. Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42 K3 (1956).

$Cu^{(63)}(\gamma,n)$ E_γ = 17.57 to 17.83

Dip in activation curve found for $E_\gamma \sim 17.72$

J.G. Campbell, Australian J. Phys. 8, 449 (1955).

Cu^{64} 29 35 13^h

$(1.35\gamma)/\gamma^{\pm}$ = 0.0207 s77 Cp

B.S. Dželepov, J.V. Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956); Izvest. Akad. Naul Ser. Fiz. SSSR 17, 511 (1953).

Cu^{65} 29 36

Level $Cu^{65}(n,n'\gamma)$ E_n = 4.4

γ	90†	1.12 *2*	scin

†Photons/100 0.97γ's from $Cu^{63}(n,n'\gamma)$

R.M. Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42 K3 (1956).

Cu^{66} 29 37 5.1^m

			$55^h Ni^{66}$ source
β^-	1.64 *3*		scin
	2.63 *3*		
$\gamma(Zn^{66})$	1.03 *2*		scin

N.R. Johnson, R.K. Sheline, R. Wolfgang, Phys. Rev. 102, 831 (1956).

Zn 30

Level $Zn(n,n')$ E_n = 2.45

$\sigma(90°)$	Level	pulsed n's
62 *4*	1.08 *4*	σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

Capture γ's $Zn(th\ n,\gamma)$ scin Cp

11†	1.07 *3*	12†	1.77 *3*
7†	1.26 *3*	10†	2.02 *3*

Study covered E_γ = 0.3 to 3

†Photons/100 Zn captures ±20% (σ_a = 1.09)

(Max in Zn^{65}, Zn^{67} + Zn^{68}, Zn^{69}, Zn^{71} = 22, 62, 16, 0.05†)

T.H. Braid, Phys. Rev. 102, 1109 (1956).

Zn^{63} 30 33

Level $Cu^{63}(p,n)$ E_p = 4.2 to 5.3; VdG

Level	thresh n, ~0°
g.s.	Q = -4.149 *4*
0.191 *11*	
0.642 *11*	
1.043 *15*	

Graph of $\sigma(\sim 0°)$ given for n yield

R.M. Brugger, T.W. Bonner, J.B. Marion, Phys. Rev. 100, 84 (1955).

Zn^{64} 30 34

Capture γ's $Cu^{63}(p,\gamma)$ E_p = 2

32†	0.78 *2*	40†	2.27 *5*	scin
100†	0.97 *1*		2.38? *5*	
17†	1.16 *3*		3.04 *5*	
29†	1.30 *3*		3.84? *5*	
41†	2.07 *4*		5.64? *5*	

Other γ's with $5.6 < E_\gamma < 10$

(0.97 γ)(0.78, 1.16, 1.30, 2.07, 2.38 γ)*

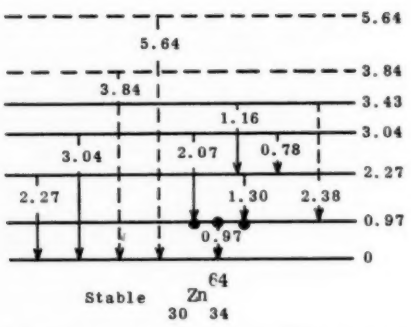
No (0.97 γ)(2.27 γ)*

*With E_p = 2.5

Continued

Zn^{64}
30 34

Continued



C.E.Weller, J.C.Grosskreutz, Phys. Rev. 102, 1149 (1956); 99, 655A (1955).

Zn^{65}
30 35
245^{d}

β^+ **0.324** *4* sl
$\epsilon_K/\beta^+ = 47 \pm 5$ from (K x ray)/$\beta^+ = 20 \pm 2$ and using $\omega_k = 0.42$ pc with magnetic field

P.Avignon, Ann. Phys. 1, 10 (1956); Compt. rend. 237, 157 (1953).

$Zn^{(64)}$(slow n,γ)

$\gamma(Cu^{65})$ **1.112** *3* scin
$1.112\gamma/\beta^+ = 47$ $\gamma/\gamma^{\pm}$

K.E.Johansson, Arkiv Fysik 10, 247 (1956).

Zn^{65}
30 35

Levels $Cu^{(65)}$(p,n) $E_p \sim 2.9$

100+	g.s.	Q = **-2.131** *5*
100+	**0.118** *8*	

0.052, 0.092 levels not observed ($< \sim 20$†)
n resonances in S used to select E_n

J.B.Marion, R.A.Chapman, Phys. Rev. 100, 1795A (1955); 101, 283 (1956).

Level Cu^{65}(p,n) E_p = 2.1 to 4.1; VdG

Level		thresh n, $\sim 0°$
g.s.	Q = **-2.136** *4*	
0.78 *3*		
1.26 *3*		
1.93 *2*		

No indication of 0.052, 0.092, 0.114 levels
Graph of $\sigma(\sim 0°)$ given for n yield

R.M.Brugger, T.W.Bonner, J.B.Marion, Phys. Rev. 100, 84 (1955).

Zn^{66}
30 36

Capture γ's Cu^{65}(p,γ) E_p = 1.9 scin

0.83 *2*	
1.04 *1*	**2.72** *4*
1.37 *2*	**3.39**?
1.71*	**3.76** *5*
1.78? *3*	**4.12** *5*
2.17 *4*	**4.33** *5*
2.41 *4*	**4.52**? *5*
2.48*	$4.5 < E_\gamma < 10$

(1.04 γ)(0.83, 1.37, 1.71, 2.17, 2.48, 2.72 γ)
*Observed only in coincidence spectra

C.E.Weller, J.C.Grosskreutz, Phys. Rev. 102, 1149 (1956); 99, 655A (1955).

Zn^{67}
30 37

Level $Zn^{(67)}(\gamma,\gamma)$ $E_\gamma \leq 22$; scin
γ **0.090** *5* $\gamma\gamma$ delay = $8.8^{\mu s}$ *10*

S.H.Vegors, Jr., P.Axel, Phys. Rev. 101, 1067 (1956).

Ga^{66}
31 35
9.4^{h}

$\gamma(Zn^{66})$ $Zn^{(66)}$(22-Mev d,2n)

1.89	**3.35** scin pr
2.14	**3.76**
2.38	**4.14**
2.73	**4.27**
3.23	**4.78**

D.E.Alburger, B.J.Toppel, Phys. Rev. 100, 1357 (1955).

Ga^{67}
31 36

Levels Zn^{67}(p,n) E_p = 1.8 to 3.9

g.s.	thresh n, $\sim 0°$
0.357 *7*	**1.235** *15*
0.857 *20*	**1.544** *20*

R.A.Chapman, J.B.Marion, J.C.Slattery, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956); verbal report.

Ga^{68}
31 37
68^{m}

β^+ 4.1† **(0.92)** 275^{d} Ge^{68} source; sl
100† **1.94** *5*
$\gamma(Zn^{68})$ 7† **1.02** *2* scin
$\beta^+/1.02\gamma = 14.4$ *17* (if no Ge^{68} β^+) scin $\gamma^{\pm}/\gamma$

B.Crasemann, D.E.Rehfuss, H.T.Easterday, Phys. Rev. 102, 1344; Bull. Am. Phys. Soc. 1, No. 5, 253 F6 (1956).

Ga^{68}
31 37

Level $Zn^{(68)}$(p,n) E_p = 2.7 to 4.3

Level		thresh n, $\sim 0°$
g.s.	Q = **-3.694** *6*	
0.170 *9*		

R.M.Brugger, T.W.Bonner, J.B.Marion, Phys. Rev. 100, 84 (1955).

Levels Zn^{68}(p,n) E_p = 3.6 to 5.3

g.s.	thresh n, $\sim 0°$
0.189 *8*	
0.344 *9*	**1.112** *23*
0.578 *12*	**1.234** *23*
0.854 *17*	**1.586** *23*

R.A.Chapman, J.R.Marion, J.C.Slattery, Bull. Am. Phys. Soc. 1, No. 2, 95, N3 (1956); verbal report.

Ga^{69}
31 38

Level $Ga^{69}(\alpha,\alpha'\gamma)$ E_α = 4.8
γ **0.324** $\epsilon B(E2) = 0.0079$ scin

L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

Ga^{70} 31 39

Resonances $Ga^{69}(n)$ chopper

$\sigma_o(10^3 b)$	E_o(ev)	Γ(ev)	Γ_n(ev)
1.8 4	112	0.36 2	0.06
1.5	340	0.49	0.19
1.5 2	710	1.6 2	1.3

Assumed $\Gamma_\gamma = 0.3$ ev and g = 1/2

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

Ga^{71} 31 40

Level $Ga^{71}(\alpha,\alpha'\gamma)$ $E_\alpha = 4.4$

γ 0.513 $\epsilon B(E2) = 0.012$ scin

L.W.Fagg, E.H.Geer, E.A.Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

Ga^{72} 31 41 ^{14h}

$\gamma(Ge^{72})$ $Ga^{(71)}(n,\gamma)$ scin

$\lesssim$0.8†	0.32 1	5†	1.24 2
$\lesssim$1.1†	0.39 1	$\lesssim$1.3†	1.32 3
$\lesssim$1.8†	0.44 1	2.8†	1.46 1
3.7†	0.51 1	7.8†	1.59 2
6.5†	0.60	$\lesssim$2†	1.79 3
22†	0.63	8.4†	1.88 1
2†	0.72 2	41†	(2.20)
100†	(0.835)	$\lesssim$2†	2.40 2
7†	0.91 2	30†	(2.50)*
9†	1.04 1	0.6†	2.82 1

γ's in γ(0.68 ce) delay spectrum

0.03†	0.115 4		
0.05†	0.62 2	0.20†	1.71 2
0.04†	0.73 3	0.07†	1.82 4
0.16†	0.95 2	0.07†	2.15 4
0.04†	1.34 6	0.08†	2.69 3

Table of $\beta\gamma$ given showing additional 1.68 γ

(0.84 γ)(0.63, 0.77, 0.89, 1.05, 1.30, 1.62, 1.87, 2.20, 2.50 γ)

(0.63 γ)(0.62, 0.84, 1.05, 1.30, 1.48, 1.64, 1.79, 1.90 γ)

(1.47 γ)(1.90, 1.59, 1.30, 1.05 γ)

Decay scheme proposed with levels in Ge^{72}:

g.s. (0^+), 0.69 ($\tau = 0.3^{\mu s}$, 0^+), 0.84 (2^+), 1.46 (2^+), 1.73 ($2^+,3^+$), 2.06 (2^+), 2.39 ($1^+,2^+$), 2.51 (2^+), 2.82 ($1^+,2^+$), 3.04 ($2^-,3^-$), 3.32 ($2^-,3^-$), 3.34 (2^-)

No 0.69 photon ($\lesssim$2†)

*Unresolved 2.508γ and 2.491γ

J.J.Kraushaar, E.Brun, W.E.Meyerhof, Phys. Rev. 101, 139 (1956).

Ga^{72} 31 41

Resonances $Ga^{71}(n)$ chopper

$\sigma_o(10^3 b)$	E_o(ev)	Γ(ev)	Γ_n(ev)
2.7 10	95	0.37 4	0.07
4.3 1	290	7.7 5	7.4
3.1 1	380	3.6 5	3.3
0.7 2	770	0.52 10	0.22

Assumed $\Gamma_\gamma = 0.3$ ev and g = 1/2

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

Ga^{74} 31 43 $^{\sim 8^m}$

τ $\sim 8^m$ $Ge^{(74)}$(fast n,p)

$\gamma(Ge^{74})$ 0.58 scin

2.3

2.6

H.Morinaga, Phys. Rev. 103, 504 (1956).

Ge ? 32 $^{14^d}$

τ 14^d Ge(pile n) chem

x Ga K x ray crit a

E_{max} 0.164 γ continuum, scin

No γ observed scin

Half-life from decay of γ continuum

M.Langevin, Ann. Phys. 1, 57 (1956); Compt. rend. 238, 2518 (1954).

Ge^{68} 32 36 $^{275^d}$

τ 275^d 20 $Zn^{(66)}$(37-Mev α,2n) chem

No β^+ with $E_\beta > 0.3$ sl

B.Crasemann, D.E.Rehfuss, H.T.Easterday, Phys. Rev. 102, 134; Bull. Am. Phys. Soc. 1, No. 5, 253 F6 (1956).

Ge^{71} 32 39 $^{11^d}$

$Ge^{(70)}$(pile n,γ) chem

E_ϵ 0.237 5 γ continuum, scin

$(e_{AL}+L$ x ray$)/e_{AK} = 1.26$ pc

$\epsilon_L/\epsilon_K = 0.25$ 2 ($\omega_K = 0.473^*$)

Theoretical value for ϵ_L/ϵ_K is 0.11

M.Langevin, Ann. Phys. 1, 57 (1956); Compt. rend. 238, 2518; 239, 1625 (1954); *J. Laberrigue-Frolow, P.Radvanyi, M.Langevin, J. phys. radium 17, 530 (1956).

Ge^{72} 32 40

Level $Ge^{(72)}(\gamma,\gamma)$ As^{72} recoil

(0.835) $\tau = 3.2^{\mu\mu s}$ 8 σ

J = 2 $\gamma,\gamma(\theta)$

F.R.Metzger, Phys. Rev. 101, 286 (1956).

Ge^{74} 32 42

Level $Ge^{(74)}(\gamma,\gamma)$ As^{74} recoil

(0.596) $\tau = 13^{\mu\mu s}$ 2 σ

J = 2 $\gamma,\gamma(\theta)$

F.R.Metzger, Phys. Rev. 101, 286 (1956).

As^{72} 33 39 $^{26^h}$

$\gamma(Ge^{72})$ $Ga^{(69)}$(17-Mev α,n) chem

scin $\gamma,\gamma\gamma,\gamma$ce

10.3†	0.63 1		
	0.73* 2	2.6†	2.68 2
100†	(0.835)	3.7†	2.20 2
	0.90* 2		2.24*
2.7†	1.05 1	1.2†	2.32 3
2.2†	1.25 2	1.7†	2.51 2
1.4†	1.37 2	0.9†	2.63?
4.0†	1.46 1	0.7†	2.76?
1.1†	1.68 2	1.5†	2.91 3
	1.75*		3.0*
1.0†	1.92 3	0.3†	3.74 5

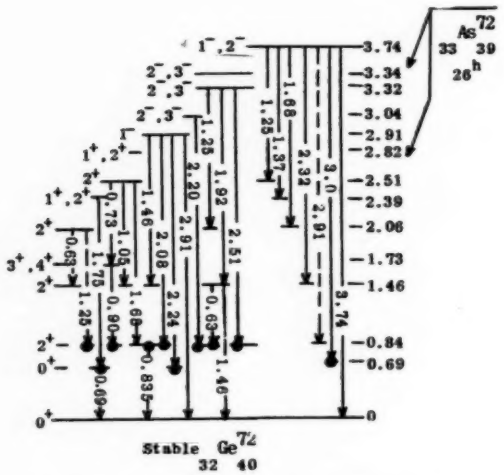
Continued

As^{72} 33 39 26^h

Continued

(0.835 γ)(0.63, 0.73, 0.90, 1.05, 1.25, 1.37, 1.92, ~2.1, 2.32, 2.51γ)
(γ±?, 1.75, 2.24, 3.0γ)(ce 0.69γ)
β⁺/0.835γ = 0.96 *10* scin γ±/γ

*Observed in coincidence spectrum only 3.34 and 2.82 levels known from decay of $14^h Ga^{72}$ were not observed



E. Brun, J.J. Kraushaar, W.E. Meyerhof, Phys. Rev. 102, 808 (1956); Phys. Rev. 100, 1795A (1955).

As^{75} 33 42

	ground state	
μ	+1.45 *15*	S
q	+0.32 *5*	

K. Murakawa, S. Suwa, Rept. Inst. Sci. Technol, Univ. of Tokyo 6, 209 (1952).

Levels	$As^{75}(n,n')$	E_n = 2.45 pulsed n's
σ(90°)	Level	
27 *6*	0.78 *4*	
47 *8*	1.25 *3*	
21 *3*	1.63 *2*	σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

γ	$As^{75}(\gamma,\gamma)$	$E_\gamma \leq 22$; scin
	0.283 *15*	γγ delay = 12^{ns} *3*

S.H. Vegors, Jr., P. Axel, Phys. Rev. 101, 1067 (1956); 100, 1238A (1955).

γ	$As^{75}(n,n'\gamma)$	E_n = 1.35; scin
	(0.280)	n,γ delay = 21^{ns} *2*
		pulsed neutrons

E.C. Campbell, P.H. Stelson, ORNL-2076 p. 32 (1956).

As^{75} 33 42

γ	$As^{75}(n,n'\gamma)$	E_n = 3.7; scin
	0.815 *10*	
	1.02 *1*	

M.A. Rothman, H.S. Hans, C.E. Mandeville, Phys. Rev. 100, 83 (1955).

As^{76} 33 43 26.5^h

τ	26.5h 2	differential ic

B.S. Dzhelepov, O.E. Kraft, Vestnik-Leningrad Univ., Ser. Mat. Fiz. Khim. No. 8, 97 (1955); Chem. Abstr. 50, No. 12675e (1956).

β⁻			
	1.77 *2*	F-K linear*	sl β,βγ
	2.42 *1*	F-K linear*	
	2.97 *1*	ΔJ = 2, yes shape*	sl

*$E_\beta \geq 1$

A.V. Pohm, R.C. Waddell, E.N. Jensen, Phys. Rev. 101, 1315 (1956).

γ(Se^{76})	0.5605 *3*	cryst

N. Ryde, B. Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

(0.64 γ)(0.55 γ)	delay = $23^{\mu\mu s}$ *15*	scin

C.P. Coleman, Phil. Mag. 46, 1135 (1955).

As^{85} 33 52

Assignment here of 0.43^s delayed-n activity accounts for fission yields in Kr region of U^{233}, U^{235}, U^{238}, Pu^{239}
[E_β > 9, $B_n(Se^{75})$ ~5 from systematics]

W.H. Fleming, quoted by R.K. Wanless, H.G Thode, Can. J. Phys. 33, 541 (1955).

Levels	Se(n,n')	E_n = 2.45 pulsed n's
σ(90°)	Level	
64 *8*	0.66 *5*	
43 *5*	1.50 *3*	σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

γ	Se(n,n'γ)	E_n = 3.7; scin
	1.05 *2*	
	1.50 *3*	

M.A. Rothman, H.S. Hans, C.E. Mandeville, Phys. Rev. 100, 83 (1955).

Resonance peaks	Se(n) E_o(ev)	$\sigma_o\Gamma^2$	E_n = 1 to 2000 ev chopper
	27.1	53	
	211	1410	
	270	3520	
	383	920	

L.M. Bollinger, D.A. Dahlberg, R.R. Palmer, G.E. Thomas, Phys. Rev. 100, 126 (1955).

Se 34

Resonance peaks — Se(n) chopper

E_o(ev)	A*	E_o(ev)	A*
212	78	973	78
272		1970	81
383		3110	
673	78	4120	81
884		5340	81

*Product A assignment from enriched samples

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

Resonance peaks — Se(n) E_n = 1 to 80 kev, Li(p,n)

3 kev $l_n = 0$

7 $l_n = 0$

Assigned to Se^{81}

Graph given showing 6 more peaks

H.W.Newson, J.H.Gibbons, H.Marshak, R.M. Williamson, R.A.Mobley, A.L.Toller, R.Block, Phys. Rev. 102, 1580 (1956); 94, 774A (1954).

Se^{73} 34 39 7.1 h

Ge(70)(28-Mev α,n) chem

β^+	100†	1.29 *1*			sl
	≤1†$	1.65 *2*			
$\gamma(As^{73})$			α_K*	K/LM	sl ce,
	126†	0.0658 *1*	0.22	10.2 M1	scin
	154†	0.359 *1*	0.011	8 M2	

$\gamma^{\pm}$(0.066, 0.359 γ) delay = 6.0^μs *2*

(0.066 γ)(0.359 γ) $\gamma^{\pm}$(0.066 γ) delay < 5^μs

No other γ (< 2†)

$From 6^μs delay for ≥ 99% of $\gamma^{\pm}$(0.066 γ)

*From ce_K per β^+ and theoretical ϵ/β^+ ratio

R.W.Hayward, D.D.Hoppes, Phys. Rev. 101, 93 (1956); 98, 1172A (1955).

Se^{75} 34 41 127 d

(0.124 γ)(0.281 γ)(θ) $\eta(\pi)$ = −0.51 *3* scin

(0.138 γ)(0.269 γ)(θ) $\eta(\pi)$ = +0.024 *45*

Agree with J = 1/2 to 5/2, 3/2(5/2), 1/2(3/2), 3/2 for As^{75} levels at 0.405, 0.281, 0.269, g.s.

Probably no $P_4(\cos\theta)$ terms

W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 102, 1130 (1956).

(0.097 γ)(0.280 γ) delay = 18.0^ns *15* scin

A.W.Schardt, Bull. Am. Phys. Soc. 1, No. 2, 85, D1 (1955).

Se^{78} 34 44

Resonance peaks — Se^{77}(n) chopper

E_o(ev)	E_o(ev)
212	973
673	

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

Se^{81} 34 47

Resonance peaks — Se^{80}(n) chopper

E_o(ev)	E_o(ev)
1970	5340
4120	

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

Br ? 35

γ	Br(γ,?γ)	$E_\gamma \leq 22$;	scin
	0.155 *10**	γγ delay = 130^μs *20*	
	0.270 *15*	γγ delay = 32^μs *10*	

*Threshold = 9.85 *25*

S.H.Vegors, Jr., R.B.Duffield, Bull. Am. Phys. Soc. 1, No. 4, 206 R1 (1956); verbal report.

Br^{79} 35 44

Level — $Br^{79}(\alpha,\alpha'\gamma)$ E_α = 3.6; scin

γ 0.219 εB(E2) = 0.025

No other γ

E.A.Wolicki, L.W.Fagg, E.H.Geer, Phys. Rev. 100, 1265A (1955); verbal report.

Br^{80} 35 45 18^m g.s.

Br^{79}(pile n,γ)

β^+	2.8†	0.868 *7*	sπ
β^-	~15†	1.38 *8*	sl β γ
	~85†	1.99 *1*	sl
$\gamma(Kr^{80})$		0.620	scin
(1.38β)(0.620 γ)			sl

No other γ (< 4†)

J.Laberrigue-Frolow, Ann. Phys. 1, 152 (1956); Compt. rend. 232, 1201 (1951); 234, 2599 (1952); 236, 1246 (1953); 238, 677 (1954); J. phys. radium 15, 584 (1954).

Br^{80} 35 45 4.5 h

$Br^{(79)}$(slow n,γ)

(ce_K 0.048 γ)(ce_K 0.036 γ)(θ) favors M3 for 0.048γ and E1 for 0.036γ scin

E.Breitenberger, Proc. Phys. Soc. 69A, 453 (1956).

Br^{80} 35 45

Resonance peaks — Br^{79}(n) chopper

σ₀	E_o(ev)	Γ(ev)	Γ_γ(ev)
3700	35.4	0.44	0.395
1670	54.3	0.375	0.347
1320	188	0.450	0.364
	204*		
	238		
	293*		
	318		
	392*		
	467*		

*May be in Br^{82}

J.M.LeBlanc, L.M.Bollinger, R.E.Coté, Phys. Rev. 100, 1248A (1955); verbal report.

Br^{81} 35 46

Level — $Br^{81}(\alpha,\alpha'\gamma)$ E_α = 3.6; scin

γ 0.278 εB(E2) = 0.031

E.A.Wolicki, L.W.Fagg, E.H.Geer, Phys. Rev. 100, 1265A (1955); verbal report.

Br^{82} 35 47 36^h

β^-	100%	**0.435**			sl
$\gamma(Kr^{82})$	70†	**0.556**	30†	**0.825**	sl ce,
	40†	**0.615**	45†	**1.042**	scin
	30†	**0.698**	28†	**1.313**	
	100†	**0.777**	19†	**1.478**	

No β with $E_\beta > 0.435$ ($< 0.6\%$)

N. Benczer, C.S. Wu, Bull. Am. Phys. Soc. 1, No. 1, 41 K1 (1956); verbal report.

$Br^{(81)}$(pile n, γ)

β^-	**0.444**	1	F-K linear	sl
$\gamma(Kr^{82})$ 102†	**0.545**	2	$\alpha_K = 0.00068^*10$	scin γ,
			M2/E1 = 0.0237$^\$$	sl ce
50†	**0.610**	2	$\alpha_K = 0.0016^*2$	
			E2/M1 = 5.29$^\$$	
37†	**0.688**	2	$\alpha_K = 0.0011^*2$	
100†	**0.766**	3	$\alpha_K = 0.0010$ 2	
30†	**0.817**	7	$\alpha_K = 0.00032^*9$	
36†	**1.029**	5	$\alpha_K = 0.00036^*3$	
36†	**1.305**	5	$\alpha_K = 0.00018^*2$	
			E2/M1 = 15.8$^\$$	
18†	**1.469**	7	$\alpha_K = 0.00018^*3$	
	1.85	?		scin
	2.1	?		

(1.469 γ)(0.545, 0.610γ) scin

(0.766 γ)(1.305γ) No (0.766 γ)(1.469γ)

(0.766 γ)(ce 0.688γ) scin γ, sl ce

($E_\gamma \geq 1.305$)(ce 0.545, 0.610, 0.766γ)

No ($E_\gamma \geq 1.029$)(ce 0.688γ)

(0.610 γ)(1.469 γ)(θ) scin

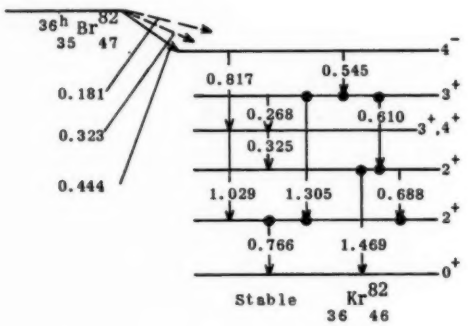
(1.305 γ)(0.766 γ)(θ) (0.545 γ)(0.610 γ)(θ)

(0.545 γ)(1.305 γ)(θ) (0.545 γ)(1.469 γ)(θ)

$\gamma\gamma(\theta)$ consistent with proposed decay scheme

*$\alpha_K \doteq 0.0008$ (theoretical E2) used for 0.766γ

$^\$$From $\gamma\gamma(\theta)$



R.C. Waddell, E.N. Jensen, Phys. Rev. 102, 816 (1956).

Br^{82} 35 47

Resonance peaks — Br^{81}(n) — chopper

E_o(ev)	E_o(ev)
101	**293***
135	**392***
204*	**467***

Other peaks at 553, 669, 1540 ev

*May be in Br^{80}

J.M. LeBlanc, L.M. Bollinger, R.E. Cote, Phys. Rev. 100, 1248A (1955); verbal report.

Kr 36

Relative isotopic abundances ms

No Kr^{76} ($< 4 \times 10^{-6}\%$) No Kr^{77} ($< 3 \times 10^{-5}\%$)

No Kr^{79} ($< 2 \times 10^{-5}\%$) No Kr^{81}, Kr^{87} ($< 10^{-5}\%$)

No Kr^{85} ($< 5 \times 10^{-5}\%$) No Kr^{88} ($< 10^{-6}\%$)

No Kr^{89} ($< 2 \times 10^{-6}\%$)

D.C. Hess, ANL-5420 (1956).

Kr^{79} 36 43

Levels — Kr^{78}(d, p) — $E_d = 4$

g.s. Q = 5.9 ppl 90°

0.4

N.C. Blais, W.W. Watson, Bull. Am. Phys. Soc. 1, No. 6, 281 B9 (1956).

Kr^{80} 36 44

Level — $Kr^{(80)}(\alpha, \alpha'\gamma)$ — $E_\alpha = 6.6$

γ **0.610** scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Kr^{81} 36 45

Levels — Kr^{80}(d, p) — $E_d = 4$

g.s. Q = 5.1 ppl 90°

0.5

N.C. Blais, W.W. Watson, Bull. Am. Phys. Soc. 1, No. 6, 281 B9 (1956).

Kr^{82} 36 46

Level — $Kr^{(82)}(\alpha, \alpha'\gamma)$ — $E_\alpha = 6.6$

γ **0.775** scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Kr^{83} 36 47

ground state

J **9/2** enriched Kr^{83} S

q **+0.22** 2

E. Rasmussen, V. Middelboe, Kgl. Danske Videnskab. Selskab Mat.-fys. Medd. 30, No. 13 (1955).

Level — $Kr^{(83)}(\alpha, \alpha'\gamma)$ — $E_\alpha = 6.6$

γ **0.457** scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956).

Kr^{84} 36 48

Level — $Kr^{(84)}(\alpha, \alpha'\gamma)$ — $E_\alpha = 6.6$

γ **0.880** scin

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Kr^{85} 36 49 10^y e.s.

Charges 1 to 10 (av. = 1.51) found on recoils

Charge distribution given s Rb^{85} recoil

A.H. Snell, F. Pleasonton, Bull. Am. Phys. Soc. 1, No. 5, 263 E7 (1956); No. 1, 42, K6 (1956).

Kr^{85} 36 49 4.4^h — IT 22% U^{235}(n,f) ms
From 10.3^y Kr^{85}/Rb^{85} yield
Authors conclude U^{235} fission yield is a smooth function of A in this region

A.T.Blades, H.G.Thode, Z. Naturf. 10a, 838 (1955).

$Rb^{\leq 80}$ 37 — τ 8^d Ag(480-Mev p) chem

B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova M.Y.Kuznetsova, L.N.Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

Rb^{81} 37 44

ground state
J 3/2 M

J.P.Hobson, J.C.Hubbs, W.A.Nierenberg, H.B. Silsbee, R.J.Sunderland, Phys. Rev. 104, 101 (1956); Bull. Am. Phys. Soc. 1, No. 5 252 P4 (1956).

30^m level
J 9/2 M

J.C.Hubbs, W.A.Nierenberg, H.A.Shugart, H.B. Silsbee, Phys. Rev. 104, 757 (1956); Bull. Am. Phys. Soc. 1, No. 5, 253 P5 (1956).

Rb^{82} 37 45

0.24 level
J 5 M

J.P.Hobson, J.C.Hubbs, W.A.Nierenberg, H.B. Silsbee, R.J.Sunderland, Phys. Rev. 104, 101 (1956); Bull. Am. Phys. Soc. 1, No. 5 252 P4 (1956).

Rb^{82} 37 45 1.3^m g.s. — τ 1.1^m 2 Ag(480-Mev p) chem
β^+ 3.5
d 25^{d}Sr chem

B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova M.Y.Kuznetsova, L.N.Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

Rb^{82} 37 45 6.3^h — β^+ 100% 0.783 sl
γ's same as in Br^{82}, q.v.

N.Benczer, C.S.Wu, Bull. Am. Phys. Soc. 1, No. 1, 41 K1 (1956); verbal report.

Rb^{83} 37 46

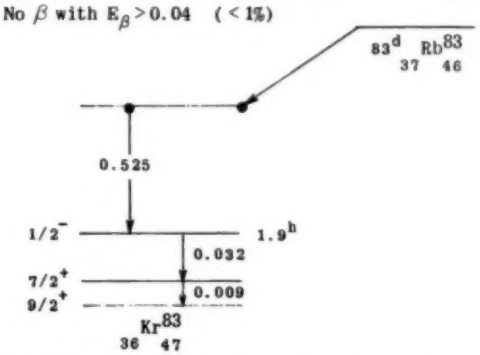
ground state
J 5/2 M

J.P.Hobson, J.C.Hubbs, W.A.Nierenberg, H.B. Silsbee, R.J.Sunderland, Phys. Rev. 104, 101 (1956); Bull. Am. Phys. Soc. 1, No. 5 252 P4 (1956).

Rb^{83} 37 46 83^d — τ 100^d Ag(480-Mev p) chem
d 38^{h}Sr chem

B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova M.Y.Kuznetsova, L.N.Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

$Br^{(81)}$(14-Mev α,2n) chem
$\gamma(Kr^{83})$ 0.525 7 scin
(K x ray)(0.525 γ)
ϵ(0.566 level)/ϵ(total) = 1.0 ± 0.1 xγ/x
No β with $E_\beta > 0.04$ (< 1%)



M.L.Perlman, J.P.Welker, Phys. Rev. 100, 81 (1955).

Rb^{84} 37 47

ground state
J 2 M

J.P.Hobson, J.C.Hubbs, W.A.Nierenberg, H.B. Silsbee, R.J. Sunderland, Phys. Rev. 104, 101 (1956); Bull. Am. Phys. Soc. 1, No. 5, 252 P4 (1956).

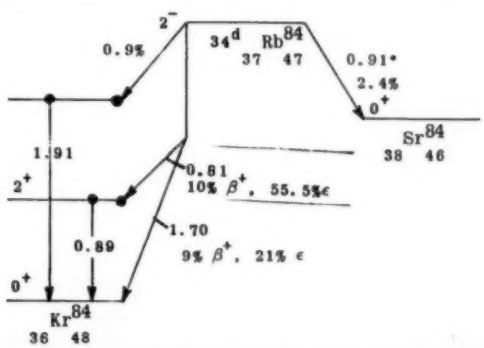
Rb^{84} 37 47 34^d g.s. — τ 33.0^d 2 $Br^{(81)}$(14-Mev α,n) chem

β^+	15†	0.81 5	scin
	15†	1.70 7	
β^-	3.7†*	0.910*	sl

$\gamma(Kr^{84})$

	100†	0.89 2	scin
	1.4†	1.91 5	

No 1.02γ (< 0.5†) (0.89γ)γ
(~0.8β)γ a$\beta\gamma$
(K x ray)(0.89, 1.91γ) $\gamma^\pm$(0.89γ)
(0.81β^+)/(0.89γ) = 0.150 11 $\gamma^\pm\gamma/\gamma$
ϵ(0.89 level)/ϵ(total) = 0.71 3 xγ/x



J.P.Welker, M.L.Perlman, Phys. Rev. 100, 74 (1955); *C.S.Wu, N.Benczer, ibid.

Rb^{85} 37 48

ground state

q +0.27 2 M

B. Senitzky, I. I. Rabi, Phys. Rev. 103, 315 (1956); 98, 1537A (1955).

Level $Rb^{85}(\alpha, \alpha'\gamma)$ $E_\alpha = 4.4$

γ 0.148 $\epsilon B(E2) = 0.0032$ scin

L. W. Fagg, E. H. Geer, E. A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

Rb^{86} 37 49 19^d g.s.

β^- 1 to 5^+ 0.230 20 s

14^+ 0.711 15

86^+ 1.795 15 $\Delta J = 2$, yes shape

$\gamma(Sr^{86})$ 0.527 3 s ce

1.081 4

A. G. Dmitriev, P. P. Zarubin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 580 (1954).

$Rb^{(85)}$(pile n, γ) chem

β^- 15% 0.720 30 sl $\beta(1.08\gamma)$

85% 1.760 10 $\Delta J = 2$, yes shape sl

J. Laberrigue-Frolow, Ann. Phys. 1, 152 (1956).

Rb^{87} 37 50

ground state

q +0.14 6 S

H. Kopfermann, A. Steudel, J. O. Trier, Z. Phys. 144, 9 (1956).

ground state

q +0.13 1 M

B. Senitzky, I. I. Rabi, Phys. Rev. 103, 315 (1956).

Rb^{87} 37 50 ~5 x 10^{10}y

τ $4.3^{+3}_{-2} \times 10^{10}$y* specific activity

No γ, no ce 2π pc $\beta\gamma, \beta$(ce)

*Assuming 27.85% Rb^{87} in natural Rb

I. Geese-Bähnisch, Z. Phys. 142, 565 (1955); I. Geese-Bähnisch, E. Huster, Naturwiss. 41, 495 (1954).

Rb^{87} 37 50 ~5×10^{10}y

τ 4.6×10^{10}y 5

From Rb^{87}/Sr^{87} in minerals of ages determined from A^{40}/K^{40} by chem

K. Fritze, F. Strassman, Z. Naturf. 11a, 277 (1956).

τ 5.0×10^{10}y 2

From Rb^{87}/Sr^{87} in minerals of ages determined from Pb/U by ms

L. T. Aldrich, G. W. Wetherill, G. R. Tilton, G. L. Davis, Phys. Rev. 103, 1045 (1956); Bull. Am. Phys. Soc. 1, No. 1, 31 H6 (1956).

Ro 37 50

Level $Rb^{87}(\alpha, \alpha'\gamma)$ $E_\alpha = 4.4$

γ 0.407 $\epsilon B(E2) = 0.0058$

L. W. Fagg, E. H. Geer, E. A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

Rb^{88} 37 51 18^m

$Rb^{(87)}(n, \gamma)$

β^- 76% (5.30) 4π pc 1.85γ/β

$\gamma(Sr^{88})$

631†	0.908 4	14†	3.01 5		scin
62†	1.39 3	14†	3.24 3		
1000†	1.850 8	11†	3.52 5		
45†	2.11 3	4†	3.68 5		
107†	2.68 5	14†	4.87 5		

(1.85 $\gamma\gamma$)(1.39, 2.11, 2.68 $\gamma\gamma$) (2.11 $\gamma\gamma$)(0.908 $\gamma\gamma$)

N. H. Lazar, E. Eichler, G. D. O'Kelley, Phys. Rev. 101, 727 (1956).

Rb^{89} 37 52 15^m

d 3^mKr from U^{235}(n, f) chem

τ 14.9^m 3

β^- 5% 2.81 15 scin

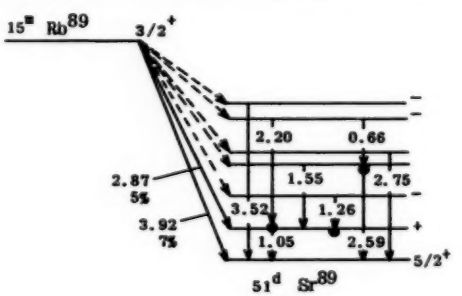
7% 3.92

$\gamma(Sr^{89})$

217†	0.663 6	190†	2.20 2		scin
1000†	1.05 2	169†	2.59 3		
717†	1.26 1	37†	2.75 5		
48†	1.55 3	29†	3.52 7		

(1.05 $\gamma\gamma$)(1.26 $\gamma\gamma$) (2.59 $\gamma\gamma$)(0.663 $\gamma\gamma$) Σ scin, scin

(1.05 $\gamma\gamma$)(2.20 $\gamma\gamma$) No γ(2.75, 3.25 $\gamma\gamma$) Σ scin



G. D. O'Kelley, N. H. Lazar, E. Eichler, Phys. Rev. 102, 223 (1956).

Sr 38 — Resonance peaks — Sr(n) — E_n = 6 to 102 kev, Li(p,n)
15* kev $l_n = 0$
27
31
95* $l_n = 0$
*Assigned to Sr^{89}

H.W.Newson, J.H.Gibbons, H.Marshak, R.M. Williamson, R.A.Nobley, A.L.Teller, R.Block, Phys. Rev. 102, 1580 (1956).

Sr^{83} 38 45 38h — τ — 34h — Ag(480-Mev p) chem
p 83^dRb chem

S.V.Kurchatov, V.N.Mekhedov, N.I.Borisova M.Y.Kuznetsova, L.N.Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

Sr^{87} 38 49 2.8h — γ — (0.388) $\alpha = 0.26$ 3 — GM
Authors conclude γ is E5

I.V.Estulin, E.M.Moiseeva, Soviet Phys. JETP 1, 463 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 541 (1955).

Sr^{88} 38 50 — $Sr^{(88)}(n,n'\gamma)$ — E_n = 4.4
γ — 0.88 1 — scin
1.85 1

R.M.Sinclair, Westinghouse Research Report 60-94511-6-R12 (1956).

Sr^{89} 38 51 51d — τ — 51^d 1 — U(150-Mev p) chem

A.Kjelberg, A.C.Pappas, Nuclear Phys. 1, 322 (1956).

$Sr^{(88)}$(pile n,γ) chem
β^- 100% 1.462 5 ΔJ = 2, yes shape sl
Not p $14^s Y^{89}$ ($< 5 \times 10^{-4}$%) no 0.91γ scin

A.Bisi, S.Terrani, L.Zappa, Nuovo Cim. 2, 1297 (1955).

p $14^s Y^{89}$ (0.02%) — 0.91γ/β

W.S.Lyon, R.R.Rickard, Phys. Rev. 100, 112 (1955).

Y 39 — Relative isotopic abundances — ms
No Y^{85}, Y^{86}, Y^{87} ($< 10^{-4}$%)
No Y^{88}, Y^{90}, Y^{93}, Y^{94} ($< 5 \times 10^{-4}$%)
No Y^{91}, Y^{92} ($< 2 \times 10^{-4}$%)
No Y^{95} ($< 3 \times 10^{-4}$%)

D.C.Hess, ANL-5420 (1956).

Y^{88} 39 49 105d g.s. — β^+ — 0.58 — Sr(10-Mev d); sd
No 0.83β (ascribed to internal pairs from 1.83γ)

W.L.Stirling, N.Goldberg, Bull. Am. Phys. Soc. 1, No. 6, 291 K6 (1956).

Y^{88} 39 49 105d g.s. — $\gamma(Sr^{88})$ — $Sr^{(88)}$(p,n) chem
92† 0.908 scin
100† 1.85
0.5† 2.76
(0.908γ)(1.85γ) — Σ scin

N.H.Lazar, E.Eichler, G.D.O'Kelley, Phys. Rev. 101, 727 (1956).

$\gamma(Sr^{88})$ (0.91) 100% dipole $\gamma\gamma(\theta)$
(1.85) 100% quadrupole
(0.91γ)(1.85γ)(θ) J = 3, 2, 0

E.D.Klema, Phys. Rev. 102, 449 (1956); Bull. Am. Phys. Soc. 1, No. 2, 85 D2 (1956).

$\gamma(Sr^{88})$ (0.91) parity change $\gamma\gamma(L)$
(1.85) no parity change
E2 $s\pi\ e^+e^-(\theta)$

C.P.Coleman, Phil. Mag. 1, 166 (1956).

Y^{88} 39 49 0.3ms — τ — 2.93×10^{-4}s 20 — 85^dZr source
Used statistical correlation method

M.D.Petroff, W.O.Doggett, Rev. Sci. Instr. 27, 838 (1956).

Y^{88} 39 49 — γ — $Y^{89}(\gamma,n\gamma)$ — $E_\gamma \leq 22$; scin
0.045 5*
0.393 15 — $\tau = 0.287^{ms}$ 15
*Assignment uncertain

S.H.Vegors,Jr., P.Axel, Phys. Rev. 101, 1067 (1956).

Y^{89} 39 50 — Levels — $Y^{89}(n,n')16^s Y$ — E_n = 0.9 to 1.8
(0.91) $\tau = 16.1^s$ 3
1.2
1.2 level feeds 16^s state; 1.53 level does not

C.P.Swann, F.R.Metzger, Phys. Rev. 100, 1329 (1955).

Y^{90} 39 51 64h — τ — 64.8^h — d Sr^{90} chem
Followed for 14 half lives

E.V.Marathe, J. Sci. Industrial Res. India 14B, 354 (1955).

$e^+/\beta^- = 3.6 \times 10^{-5}$ 9 — sl, $\gamma^+\gamma^+$
e^+ chiefly from nuclear pairs from 1.75 transition in Zr^{90}

J.S.Greenberg, M.Deutsch, Phys. Rev. 102, 415 (1956).

$Y^{90}_{39\ 41}$ 64^h

d Sr^{90} chem

$ce/\beta = 1.6 \times 10^{-4}$ 6] ce's correspond sl

$ce_K/\beta \sim 1.06 \times 10^{-4}$] to $E_\gamma = 1.736$

No photons with $E_\gamma \sim 1.74$ ($< 4.3 \times 10^{-4}$%) scin

T. Yuasa, J. Laberrigue-Frolow, L. Feuvrais, J. phys. radium 17, 558 (1956); Compt. rend. 242, 2129 (1956).

Zr 40

Relative isotopic abundances ms

No Zr^{84} ($< 3 \times 10^{-4}$%)

No Zr^{85}, Zr^{86}, Zr^{87}, Zr^{88} ($< 2 \times 10^{-4}$%)

No Zr^{89} ($< 10^{-2}$%) No Zr^{93} ($< 2 \times 10^{-3}$%)

No Zr^{95}, Zr^{97}, Zr^{98}, Zr^{99}, Zr^{101} ($< 10^{-3}$%)

No Zr^{100} ($< 5 \times 10^{-4}$%)

D.C. Hess, ANL-5420 (1956).

Levels $Zr(n,n')$ $E_n = 4.3$; scin

g.s. pulsed n's

1.4

2.2

2.8 ?

No 0.90 level

R.V. Smith, Bull. Am. Phys. Soc. 1, No. 1, 55, R6 (1956); verbal report.

Level $Zr(n,n')$ $E_n = 2.45$

$\sigma(90°)$ Level pulsed n's

23 2 **0.94** 4 σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

Level $Zr(n,n'\gamma)$ $E_n = 4.4$

γ **0.92** 2 scin

R.M. Sinclair, W.S. Emmerich, Westinghouse Research Report 60-94511-6-R11 (1956).

Level $Zr(n,n'\gamma)$ $E_n = 0.9$ to 2.2

γ **0.930** scin

No other γ observed with $0.6 < E_\gamma < 2$

J.B. Guernsey, C. Goodman, Phys. Rev. 101, 294 (1956).

γ $Zr(n,n'\gamma)$ $E_n = 0.35$ to 3.9 scin

E_γ	Thresh
0.552 5	1.48 5
0.916 15	0.92 2
1.46 3	1.46 3

Probably due to Zr^{92}, Zr^{94}

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

Zr 40

Resonance Zr(n) $E_n = 2$ to 80 kev,

peak **43** kev Li(p,n)

Assigned to Zr^{91}

Graph given showing 10 more peaks

H.W. Newson, J.H. Gibbons, H. Marshak, R.M. Williamson, R.A. Mobley, A.L. Toller, R. Block, Phys. Rev. 102, 1580 (1956).

$Zr^{89}_{40\ 49}$

$Zr^{(90)}(\gamma,n)$ β tron

Threshold for $4.3^m Zr^{89}$ (J = 1/2) = 12.37 9

Yield of $79^h Zr^{89}$ (J = 9/2) small below 12.37

P. Axel, J.D. Fox, Phys. Rev. 102, 400 (1956); 100, 1249A (1955).

$Zr^{90}_{40\ 50}$

γ $Zr^{(90)}(n,n'\gamma)$ $E_n = 0.35$ to 3.9

2.17 3 Thresh = 2.20 3 scin

2.30 3

3.29 10

Also $\gamma^{\pm}$ with threshold at 1.77 3 due to pairs from 0^+ level at 1.77

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$Zr^{91}_{40\ 51}$

ground state

μ **−1.9** 2 S

K. Murakawa, Phys. Rev. 100, 1369 (1955).

Level $Zr^{(91)}(n,n'\gamma)$ $E_n = 0.35$ to 3.9

γ **1.22** 3 Thresh = 1.26 5 scin

R.B. Day, A.E. Johnsrud, D.A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$Zr^{92}_{40\ 52}$

Level $Zr^{92}(n,n'\gamma)$ $E_n = 1$ to 5.5

γ **0.926** 9 scin

γ of same energy observed in $Zr^{94}(n,n'\gamma)$, q.v.

G.L. Griffith, Phys. Rev. 103, 643 (1956).

$Zr^{94}_{40\ 54}$

Level $Zr^{94}(n,n'\gamma)$ $E_n = 1$ to 5.5

γ **0.926** 9 scin

γ of same energy observed in $Zr^{92}(n,n'\gamma)$, q.v.

G.L. Griffith, Phys. Rev. 103, 643 (1956).

$Zr^{95}_{40\ 55}$ 65^d

β^- 11% **0.250** 30 s

53% **0.364** 8

34% **0.404** 8

0.9% **0.90** 3

0.4% **1.13** 4

$\gamma(Nb^{95})$ **0.723** 2 M1,E2 s ce

0.756 2 E1

p $90^h Nb^{95}$ (0.235 γ observed)

P.P. Zarubin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 563 (1954).

$Zr^{96}_{40\ 56}$ $\tau_{\beta\beta}$ > 5×10^{17}y 85% Zr^{96}; 4π scin $\beta\beta$
> 3.6×10^{17}y β

Search covered $2.5 < E_\beta < 4.5$
Long τ suggests ν and anti-ν are nonidentical

M. Awschalom, Phys. Rev. 101, 1041 (1956); Bull. Am. Phys. Soc. 1, No. 1, 31 H7 (1956).

$Zr^{97}_{40\ 57}$ 17^h

U(n,f) chem

$\gamma(Nb^{97})$	0.58 3 ?	scin γγ
1†	1.02*3	scin
2†	1.15 2	
0.5†	1.72 3	
(1.15γ)(0.58γ?)		scin

β(1.02, 1.15, 1.72γ)
Also observed 1.28, 1.77γ (< 0.5†)
†Relative to intensity of 96 for $60^s Nb^{97}$ 0.75γ
*Present after Zr chem; intensity grows. See Nb^{97}

R. Nordhagen, J. Thomassen, Nuclear Phys. 1, 499 (1956).

Nb 41 Relative isotopic abundances ms
Nb^{93} 100.0%
No Nb^{89}, Nb^{90} (< 12×10^{-5}%)
No Nb^{91}, Nb^{92}, Nb^{94} (< 19×10^{-5}%)
No Nb^{95}, Nb^{96}, Nb^{97}, Nb^{98} (< 1×10^{-4}%)

F.M. White, T.L. Collins, F.M. Rourke, Phys. Rev. 101, 1786 (1956).

Nb ? 41 γ $Nb^{93}(\gamma,?\gamma)$ $E_\gamma \leq 22$; scin
0.088 5 γγ delay = $6.0^{\mu\mu s}$ 15

S.H. Vegors, Jr., R.B. Duffield, Bull. Am. Phys. Soc. 1, No. 4, 206 R1 (1956).

$Nb^{90}_{41\ 49}$ 15^h g.s.

β+	1.51 3			scin
$\gamma(Zr^{90})$		10.4†	1.82	scin
109†	0.14*	11.5†	1.96	
8†	0.14*	26†	2.19	
180†	1.14	150†	2.32 2	

(~0.14γ)($\gamma^\pm$, 1.14, 1.82, 2.19γ)
(1.51β)(1.14γ) No (2.32γ)γ
*Coincidence measurements imply two 0.14 γ's

N.H. Lazar, G.D. O'Kelley, Bull. Am. Phys. Soc. 1, No. 4, 163 B9 (1956); verbal report.

$Nb^{95}_{41\ 54}$ 35^d g.s.

β−	0.162 5	$65^d Zr^{95}$ source; s
$\gamma(Mo^{95})$	0.764 2	s ce

P.P. Zarubin, Izvest. Akad. Nauk Ser. Fiz. SSSR 18, 563 (1954).

U(n,f) chem
$\gamma(Mo^{95})$ 0.767 2 scin

K.E. Johansson, Arkiv Fysik 10, 247 (1956).

$Nb^{97}_{41\ 56}$ 74^s g.s.

d 17^h Zr chem

$\gamma(Mo^{97})$		scin
100†	0.66 1	
1†	1.02 3	

R. Nordhagen, J. Thomassen, Nuclear Phys. 1, 499 (1956).

42Mo Mo(n) E_n = 1 to 80 kev,
Graph given indicating possibly Li(p,n)
9 weak resonance peaks

H.W. Newson, J.H. Gibbons, H. Marshak, R.M. Williamson, R.A. Mobley, A.L. Toller, R. Block, Phys. Rev. 102, 1580 (1956); 94, 774A (1954).

Levels Mo(n,n′) E_n = 2.45 pulsed n's

σ(90°)	Level
42 4	0.83 4
52 4	1.56 3

σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

Resonances Mo(n) chopper

E_o(ev)	Γ_n(mev)*	Isotope
45 0.5	188 30	96
72 1	24 6	98
134 2.5	170 55	97

Resonances also observed at 162, 189, 283, 350, 400, 483, 715, 842 ev
*Assuming Γ_γ = 260 mev

J.A. Radkevich, V.V. Vladimirsky, V.V. Sokolovsky Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Mo ? 42 γ Mo(γ,?γ) $E_\gamma \leq 22$; scin
0.098 5* γγ delay = $16.5^{\mu s}$ 12
*Threshold = 8.4 ± 0.6

S.H. Vegors, Jr., P. Axel, Phys. Rev. 101, 1067 (1956); 100, 1238A (1955).

$Mo^{90}_{42\ 48}$ 5.7^h τ 6.4^h Ag(550-Mev α) chem
p 15^hNb chem

B.V. Kurchatov, V.N. Mekhedov, N.I. Borisova M.Y. Kuznetsova, L.N. Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

$Mo^{91}_{42\ 49}$ 16^s g.s. β+ 3.44 $Mo^{(92)}$(≤22-Mev γ,n); s
No (3.44β)γ scin

N. Gove, F.A. Smith, R.A. Becker, Phys. Rev. 100, 1236A (1955); verbal report.

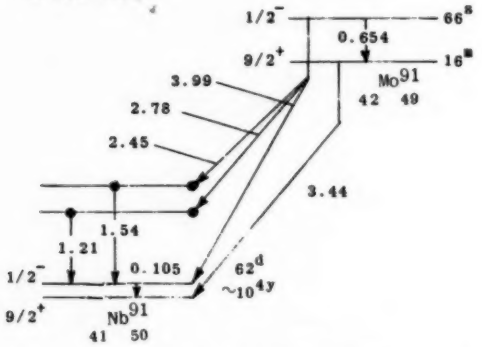
$Mo^{91}_{42\ 49}$ 66^{s}

β^+ 51† 2.45 $Mo^{(92)}$ ($\leq$22-Mev γ,n); s
35.8† 2.78
13.2† 3.99

$\gamma(Mo^{91})$
8.9* **0.654** *3* $\alpha = 0.055$ s ce,scin

$\gamma(Nb^{91})$ **1.21** scin
1.54

(2.78 β)(1.21 γ) (2.45 β)(1.54 γ)
No β(0.654 γ)
*ce per 100 β^+



N.Gove, F.A.Smith, R.A.Becker, Phys. Rev. 100, 1236A (1955); verbal report.

$Mo^{95}_{42\ 53}$

ground state
J 5/2 para

J.Owen, I.M.Ward, Phys. Rev. 102, 591 (1956).

ground state
J 7/2 S

K.Murakawa, Phys. Rev. 100, 1369 (1955).

$Mo^{97}_{42\ 55}$

ground state
J 5/2 para

J.Owen, I.M.Ward, Phys. Rev. 102, 591 (1956).

ground state
J 7/2 S

K.Murakawa, Phys. Rev. 100, 1369 (1955).

$Mo^{105}_{42\ 63}$ $\sim 5^{m}$

τ $<2^{m}$ U(fast n,f) chem

J.Flegenheimer, G.B.Baró, A.Medina, Z. Naturf. 10a, 798 (1955).

$Tc^{98}_{43\ 55}$ 10^{5y}

τ_β **1 x 10^{5y}*** from $\gamma\gamma$ count in sample of known number of Tc^{98} atoms
$\gamma(Ru^{98})$ **0.660*** **0.750***
(0.750 γ)(0.660 γ)*

Continued

$Tc^{98}_{43\ 55}$ 10^{5y}

Continued

No primordial Tc^{98} chem,n activation,ms
$6.0^{h}Tc^{99}$ found by n activation in 2 out of 18 samples believed produced from 2.2×10^{5y} Tc^{99}
$\sigma \leq 1.0$ and ~ 0.05 for $Tc^{98}(n,\gamma)$ and $Tc^{99}(n,n')$ resp. for production of $6.0^{h}Tc^{99}$

G.E.Boyd, Q.V.Larson, J.Phys. Chem. 60, 707 (1956); *G.D.O'Kelley, Q.V.Larson, G.E.Boyd, ibid.

n activation of various ores chem
Yield of $6.0^{h}Tc^{99}$ in Tc fraction was 1.40 to 2.85 times yield of $6.0^{h}Tc^{99}$ in Mo fraction in 7 out of 12 samples
If all $6.0^{h}Tc^{99}$ was produced by $Mo^{98}(n,\gamma\beta)$, the expected yield ratio was 0.96
Data interpreted as evidence of Tc^{98} in nature

E.Anders, R.N.Sen Sarma, P.H.Kato, J. Chem. Phys. 24, 622 (1956).

$Tc^{99}_{43\ 56}$ 6.0^{h}

carrier-free source from Mo^{99}
γ **(0.140)** K/LM = 5.87 *12* sl
$\omega_K = 0.70$ *3* found from e_{AK}/ce_K

J.Laberrigue-Frolow, P.Radvanyi, Compt. rend. 242, 901 (1956).

$Tc^{104}?_{43\ 61}$ 3.8^{m} g.s.?

Ru(fast n),U(28-Mev d,f) chem
τ 3.8^{m} 2
β^- ~ 2 a
$\gamma(Ru^{104})$ >1 scin
E_{dis} ~ 4 GM E_γ/β
Sign of β's from magnetic deflection

J.Flegenheimer, W.Seelmann-Eggebert, Z. Naturf. 11a, 678 (1956); 9a, 806 (1954).

$Tc^{104}?_{43\ 61}$ 18^{m}

Ru(fast n),U(28-Mev d,f) chem
τ 18^{m}
β^- ~ 3 a
$\gamma(Ru^{104})$ ~ 1.5 scin
$E_\gamma/\beta = 2.5$ Mev/β GM

Not produced by Mo(5 to 28-Mev d), Ru(28-Mev d), Mo(56-Mev α)

J.Flegenheimer, W.Seelmann-Eggebert, Z. Naturf. 11a, 678 (1956); 9a, 806 (1954).

$Tc^{105}_{43\ 62}$ 10^{m}

τ 10^{m} *1* U(fast n, f) chem
p $4.4^{h}Ru^{105}$

J.Flegenheimer, G.B.Baro , A.Medina, Z. Naturf. 10a, 798 (1955).

Ru 44

Relative isotopic abundances ms

Ru^{96}	5.57% *8*		
Ru^{98}	1.86% *4*	Ru^{101}	17.1% *1*
Ru^{99}	12.7% *1*	Ru^{102}	31.6% *2*
Ru^{100}	12.6% *1*	Ru^{104}	18.5% *1*

No Ru^{94}, Ru^{95}, Ru^{97} (<0.010%)
No Ru^{103} (<0.0001%) No Ru^{105} (<0.0007%)
No Ru^{106} (<0.0010%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

Relative isotopic abundances ms
No Ru^{86} ($<25 \times 10^{-4}$%)
No Ru^{92}, Ru^{93}, Ru^{95}, Ru^{107} ($<10^{-2}$%)
No Ru^{94}, Ru^{109} ($<3 \times 10^{-3}$%)
No Ru^{97} ($<3 \times 10^{-2}$%) No Ru^{103} ($<15 \times 10^{-3}$%)
No Ru^{105} ($<4 \times 10^{-2}$%) No Ru^{106} ($<2 \times 10^{-3}$%)
No Ru^{108} ($<10^{-3}$%)

D.C.Hess, ANL-5420 (1956).

Ru^{95} 44 51 1.6^h

τ		**1.65^h** *5*		$Ru^{(96)}(n,2n)$	chem
β^+	1†	**1.2** *1*			a
$\gamma(Tc^{95})$					
	~1†	**0.145**	0.5†	**0.640** *8*	scin
	4†	**0.340** *8*	1†	**1.110** *20*	

E.Schalscha, Nuclear Phys. 1, 481 (1956).

τ **1.7^h** *1* Ag(480-Mev p) chem

B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova M.Y.Kuznetsova, L.N.Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans.p. 111

Ru^{99} 44 55

ground state

J **5/2** natural Ru; S
μ **-0.63*** *15*
*Calculated from $\bar{\mu}$ (for A = 99, 101) = -0.66 *2*, using $\mu_{101}/\mu_{99} = 1.09$ *3*[6]

K.Murakawa, J. Phys. Soc. Japan 10, 919 (1955); 9, 427, 651 (1954). §J.H.E.Griffiths, J.Owen, Proc. Phys. Soc. 65A, 951 (1952).

Ru^{101} 44 57

ground state

J **5/2** natural Ru; S
μ **-0.69*** *15*
*Calculated from $\bar{\mu}$ (for A = 99, 101) = -0.66 *2*, using $\mu_{101}/\mu_{99} = 1.09$ *3*[6]

K.Murakawa, J. Phys. Soc. Japan 10, 919 (1955); 9, 427, 651 (1954). §J.H.E.Griffiths, J.Owen, Proc. Phys. Soc. 65A, 951 (1952).

Rh^{98} 45 53 8.7^m

τ	**8.7^m** *1*		d 17^{m}Pd chem
β^+	**2.5** *2*		scin
$\gamma(Ru^{98})$	**0.650** *10*		scin

$(2.5\beta)(0.650\gamma)$ No other β or γ

S.Katcoff, H.Abrash, Phys. Rev. 103, 966 (1956).

Rh^{99} 45 54 4.7^h

τ		**4.7^h** *1*			d 22^{m}Pd chem
β^+	10%	**0.74**			scin, pc
$\gamma(Ru^{99})$	70%*	**0.335** *10*			scin, x/γ
	20%	**0.615** *15*		**1.26** *3*	
	w	**0.89** *2*	w	**1.41** *4*	
x		**K x ray**			scin

$(0.74\beta)(0.335\gamma)$ $(0.335\gamma)(0.89\gamma)$
No other $\beta\gamma$ or $\gamma\gamma$ *Used $\omega_K = 0.80$, $\epsilon_K/\epsilon \sim 0.90$

S.Katcoff, H.Abrash, Phys. Rev. 103, 966 (1956).

Rh^{99}? 45 54 15^d

τ	**16^d** *1*	
$\gamma(Ru^{99})$	**0.088**	scin
	0.348	

$(0.088\gamma)(0.348\gamma)$

K.Hisatake, J.T.Jones, J.D.Kurbatov, Bull. Am. Phys. Soc. 1, No. 5, 271 (1956).

Rh^{101} 45 56 4.7^d

τ	**4.7^d** *2*		d 8.5^{h}Pd chem
$\gamma(Ru^{101})$	**0.312** *10*		scin

No β^+ No other γ

S.Katcoff, H.Abrash, Phys. Rev. 103, 966 (1956).

Rh^{101}? 45 56 ~5^y

τ	**>3^y**		
$\gamma(Ru^{101})$	**0.125**		scin
	0.190		

$(0.190\gamma)(0.125\gamma)$
γ's fit into levels found in $Ru^{101}(\alpha,\alpha')$

K.Hisatake, J.T.Jones, J.D.Kurbatov, Bull. Am. Phys. Soc. 1, No. 5, 271 (1956).

$\gamma(Ru^{101})$	**(0.125)**	$\alpha_K = 0.4$	scin $x\gamma/\gamma\gamma$
	(0.193)	$\alpha_K = 0.7$	

$(0.195\gamma)(0.125\gamma)$ delay $< 1.4^{m}\mu s$
Authors attributed γ's to 210^d Rh^{102}

N.Perrin, L.Dick, R.Foucher, H.Vartapetian, J. phys. radium 17, 539 (1956).

Rh^{102} 45 57 210^d

τ	**210^d** *10*	
$\gamma(Ru^{102})$	**0.475**	scin
	0.630	
	1.100	

$(0.475\gamma)(0.630\gamma)(1.100\gamma)$

K.Hisatake, J.T.Jones, J.D.Kurbatov, Bull. Am. Phys. Soc. 1, No. 5, 271 (1956).

Rh^{102} 45 57 210^d

$\gamma(Ru^{102})$ Ru(28-Mev d) chem

	54†	**0.125** 5			scin
	58†	**0.200** 4	10†	**0.72** 2	
	80†	**0.475** 5	10†	**0.79** 2	
	26†	**0.635** 5	56†	**1.08** 1	
x	100†	**Ru K x ray**			pc, crit a

No 0.086, 0.353γ scin
No β^+ (< 10%) no $\gamma^\pm$ scin
No Pd K x ray (< 5†) pc

P. Avignon, Ann. Phys. 1, 10 (1956); Compt. rend 240, 176 (1955).

Rh^{103} 45 58

Levels $Rh^{103}(n,n'\gamma)$ $E_n \sim 10$

0.040 level
τ **57.5^m** 5

$Rh^{103}(p,p'\gamma)$ E_p = 0.9 to 1.3

0.040 level scin K x ray

E3 Coulomb excitation shown. $\sigma = 3.7 \times 10^{-10}$ at E_p = 0.90 (used α_K = 40, α_L = 470)

0.365 level E_p = 2.67

γ 0.06† **(0.325)**
100† **(0.365)**

†Branching ratio from yield of K x ray after bombardment to 0.365γ's during bombardment

G. A. Jones, W. R. Phillips, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22, (1956); priv. comm.

Level $Rh^{103}(p,p'\gamma)$
γ **0.305** E2/M1 = 0.032 p, γ(L)
B(E2) = 0.208

P. H. Stelson, F. K. McGowan, Bull. Am. Phys. Soc. 1, No. 4, 164 C2 (1956); verbal report.

Rh^{105} 45 60 36.5^h g.s.

Ru^{104} (pile n, $\gamma\beta$) chem

β^-	30%	**0.247** 5		sl $\beta\gamma$
	70%	**0.560** 5		sl
$\gamma(Pd^{105})$		**0.310** 5	α_K = 0.018 6	sl ce

No 0.063γ (photons < 0.1%) scin, sl ce
(0.247β)(0.310γ)/$\beta \sim 0.25$ sl

J. Laberrigue-Frolow, Ann. Phys. 1, 152 (1956); Compt. rend. 240, 287 (1955).

Rh^{106} 45 61 30^s g.s.

$\gamma(Pd^{106})$ $1.0^y Ru^{106}$ source

100†	**0.513**			scin pr,
53†	**0.624**	1.0†	**1.77** 4	scin
3†	**0.87**	0.6†	**1.96** 5	
8†	**1.045**	0.5†	**2.10** 5	
≤ 0.8†	**1.14** ?	1.0†	**2.37** 6	
2.5†	**1.55** 4	0.2†	**2.66** 7	

No 0.41γ (< 2†) scin $\gamma\gamma$, scin
No 0.22, 0.72, 0.805, ~ 1.21, 1.39, 1.85 γ
(0.513γ)(0.62, 1.04γ; others with E_γ < 2.0)
(1.04γ)(0.87γ)
Decay scheme proposed

D. E. Alburger, B. J. Toppel, Phys. Rev. 100, 1357 (1955).

Pd ? 46

γ $Pd(\gamma,?\gamma')$ $E_\gamma \leq 22$; scin

0.180 15
0.305 15 } $\gamma\gamma'$ delay = 33$^{\mu s}$ 6

S. H. Vegors, Jr., P. Axel, Phys. Rev. 101, 1067 (1956); 100, 1238A (1955).

Pd 46

Resonances Pd(n) chopper

E_o(ev)	$g\Gamma_n$(mev)	Γ_γ(mev)
11.68 12	0.030 3	220 63
13.05 13	0.23 4	241 73
24.8 2	0.278 200	292 200
32.5 5	13.7 39	180 52
55 1	0.85 30	
77.8 20	0.50 16	
89.5 24	95	
148 5	2.66 70	
183 7	8.8 19	
283 15	50 15	
355 20	12.8 77	
427 27	43 10	
891 80		

J. A. Radkevich, V. V. Vladimirsky, V. V. Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Pd^{98} 46 52 17^m

Ru^{96}(19-Mev α, 2n) chem

τ **17.5^m** 5

From milking of 8.7^{m}Rh from Pd

S. Katcoff, H. Abrash, Phys. Rev. 103, 966 (1956).

Pd^{99} 46 53 22^m

Ru^{96}(17-Mev α, n) chem

τ		**21.6^m** 6		p 4.7^{h}Rh chem
β^+		**2.0** 1		scin, a
$\gamma(Rh^{99})$	s	**0.140**	**0.420**	double
		0.275	**0.670**	scin

(2.0β)(0.140, 0.670γ)
(0.140γ)(0.275, 0.420, 0.670γ)
(0.275γ)(0.140, 0.670γ)
(0.420γ)(0.140, 0.420γ)
$\gamma^\pm$(0.140, 0.275, 0.670γ)

S. Katcoff, H. Abrash, Phys. Rev. 103, 966 (1956).

Pd^{100} 46 54 4.0^d

τ **4.1^d** 2 Ag(480-Mev p) chem

B. V. Kurchatov, V. N. Mekhedov, N. I. Borisova M. Y. Kuznetsova, L. N. Kurchatova, L. V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

$Pd^{101}_{46\ 55}$ 8.5^h — Ru^{99}(17-Mev α, n), Ru^{99}(40-Mev α, 2n) chem

τ		8.5[h] 3				
β^+	~4%	0.58 4				scin, a
$\gamma(Rh^{101})$						scin, x/γ
	15%	0.288 9	double			
	15%	0.59 2	w	1.19 4		
	w	0.72 2	w	1.28 4		
(0.288 γ)(0.288γ)		No $\beta\gamma$				

S. Katcoff, H. Abrash, Phys. Rev. 103, 966 (1956).

$Pd^{103}_{46\ 57}$ 17^d — $\gamma(Rh^{103})$

~150°	0.052 1	K/L~0.8		sl ce
1.5°	0.324 5			
(photon 0.040γ)/(K x ray) ~0.003				pc
No 0.013, 0.053 photons				pc
No ce with 0.049 < E_{ce} < 0.10 (< 0.09°)				sl ce

°ce per 1000 ce_L of $57^m Rh^{103}$ 0.040γ

P. Avignon, Ann. Phys. 1, 10 (1956).

Ag 47 — Level — Ag(p, p'γ)

γ	~0.315	E2/M1 = 0.032	p, γ(L)
		B(E2) = 0.226	

P. H. Stelson, F. K. McGowan, Bull. Am. Phys. Soc. 1, No. 4, 164 C2 (1956); verbal report.

Resonances E_o(ev)	Γ_n^{o*}	Ag(n, γ) E_o(ev)	Γ_n^{o*}	pulsed n's E_o(ev)	Γ_n^{o*}
16.3	1.56	51.6	5.2	139.0	0.38
30.5	2.8	55.9	2.9	143.5	1.1
40.5	2.4	71.2	5.7	172.4	7
41.6	2.4	88.0	1.1	201.4	2.0
45	0.25	133.4	11	208	2.8
°Assuming g = 1/2; abundance 50%				251	13

Resonances also observed at 259, 264, 272, 290, 300, 310, 316, 326, 360, 386, 396, 403, 427, 443, 459, 466, 486, 499, 513, 523, 554, 563, 575, 586 ev °mev

See also Ag^{108}, Ag^{110}

J. Rainwater, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

$Ag^{103}_{47\ 56}$ 59^m — τ 59^m 6 — $Ag^{(107)}$(50-Mev p, 5nβ) chem

F. A. Johnson, Can. J. Phys. 33, 841 (1955).

$Ag^{104}_{47\ 57}$ 27^m — τ 27^m 1 — d 59^aCd chem

β^+	2.70 1	59^aCd source; sl	
$\gamma(Pd^{104})$			
2°	0.1184		sπ ce
7°	0.5562	K/L~7	

°Relative ce_K intensities

F. A. Johnson, Can. J. Phys. 33, 841 (1955); Proc. Roy. Soc. Canada 46, 135A (1952).

$Ag^{105}_{47\ 58}$ 45^d — $\gamma(Pd^{105})$ — Pd(22-Mev d) chem

> 20°	0.065	K/L > 0.1	scin, sl ce
7.5°	0.117	= 1.7	sl ce
42°	0.158		
68°	0.185	= 4.2	
475°	0.287	= 5.5	scin, sl ce
39°	0.328		sl ce
52°	0.351	= 0.6	
36°	0.395		
93°	0.446	= 7.2	scin, sl ce

°Relative ce_K intensities

All γ's have $\tau \gg 9^d$ so they are not due to Ag^{106}; the 0.117 γ may be due to Ag^{110}

D. E. Alburger, B. J. Toppel, Phys. Rev. 100, 1357 (1955).

$\gamma(Pd^{105})$ — Rh^{103}(25 - Mev α, 2n) chem — Pd(13 - Mev d) chem

		K/LM		
20†	0.0640 5	> 5	M1	scin, sl ce
w	0.157 1			scin
•	0.184[$] 1	3.0		sl ce
60†	0.2810 5	8.2	M1	scin, sl ce
w	0.319 2			scin $\gamma\gamma$
w	0.331 2			scin $\gamma\gamma$
100†	0.345 1	5.8	E2	scin, sl ce
w	0.393 3			scin
~30†	0.443 1	7.0		scin, sl ce
~8†	0.654 5			scin

(K x ray)(0.064, 0.281, 0.345, 0.443, 0.654γ)
(0.064γ)(0.281γ) (0.319γ)(0.331γ)
(0.443γ)(0.654γ)

°ce only $Could be $\gamma(Ag^{105})$ or $\gamma(Pd^{105})$

R. W. Hayward, D. D. Hoppes, Bull. Am. Phys. Soc. 1, No. 1, 42, K4 (1956); verbal report.

$Ag^{106}_{47\ 59}$ 8.6^d — $\gamma(Pd^{106})$ — Pd(22-Mev d) chem

	0.22	180°	K/L = 3.2	scin,
	0.408	135°		sl ce
100†	0.513	567°	K/L = 7.7	
20†	0.624	95°		
20†	0.72	78°		
	0.805	45°		
31†	1.045	37°		sl ce, pe,
10†	1.131	13°		scin
~10† [	1.205	12°		
	1.225	7°		
10†	1.388	1.8°		sl ce,
33†	1.53	10°		scin pr
6†	1.72			scin pr
5†	1.85			
1†	2.10			
0.3†	2.63			
Other γ's with 2.0 < E_γ < 2.5				scin pr

No 0.87, 1.96, 2.41 γ

°Relative ce_K intensities

Decay scheme proposed

D. E. Alburger, B. J. Toppel, Phys. Rev. 100, 1357 (1955).

$Ag^{107}_{47\ 60}$ Levels $Ag^{107}(p,p'\gamma)$ $E_p = 3.0$; $Ag^{107}(\alpha,\alpha'\gamma)$ $E_\alpha = 4.0$

γ	**0.319** *3*	B(E2) = 0.16	scin
	0.419 *4*	= 0.23	

L.W.Fagg, E.A.Wolicki, R.O.Bondelid, K.L. Dunning, S.Snyder, Phys. Rev. 100, 1299; 98, 1538A (1955).

$Ag^{108}_{47\ 61}$ 2.3^m

β^-	**1.7** *1*	$Ag^{(107)}(n,\gamma)$; a	
β^+		scin $\gamma^\pm$	
$\gamma(Pd^{108})$	**0.405**	scin	
$\gamma(Cd^{108})$	**0.639**	See also Ag^{110}	

M.C.Joshi, B.V.Thosan, Proc. Indian Acad. Sci. 43A, 255 (1956).

$Ag^{108}_{47\ 61}$ Resonances $Ag^{(107)}(n;\ n,\gamma)$ pulsed n's; scin γ

E_o(ev)	$\sigma_o\Gamma$	Γ(mev)	$g\Gamma_n$(Mev)
16.3	250	120	3.2
41.6	240	~500	7.8
45.0	24	160	0.9
51.6	470	130	19

* For unassigned Ag resonances, see Ag

J.Rainwater, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); G. Grimm et al., Phys. Rev. 98, 1161A (1955); W. W.Havens et al., Bull. Am. Phys. Soc. 1,No. 4, QUU P15 (1956); verbal report.

Resonances $Ag^{(107)}(n;\ n,\gamma)$ pulsed n's

E_o(ev)	J	Γ_γ(mev)	Γ_n(mev)
16.3	0	138	12
42	1	137 *19*	5.0 *4*
45		~200	
51.8	1	136 *16*	20.8 *9*

E.R.Rae, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$Ag^{109}_{47\ 62}$ Levels $Ag^{109}(p,p'\gamma)$ $E_p = 3.0$; $Ag^{109}(\alpha,\alpha'\gamma)$ $E_\alpha = 4.0$

γ	**0.306** *3*	B(E2) = 0.18	scin
	0.412 *4*	= 0.31	

L.W.Fagg, E.A.Wolicki, R.O.Bondelid, K.L. Dunning, S.Snyder, Phys. Rev. 100, 1299; 98, 1538A (1955).

$Ag^{110}_{47\ 63}$ 24^s g.s.

β^-	**2.7** *1*	$Ag^{(109)}(n,\gamma)$; a	
$\gamma(Cd^{110})$	**0.967**	scin	

Samples fixed on endless belt irradiated by Po - Be source. Belt speed varied.

M.C.Joshi, B.V.Thosan, Proc. Indian. Acad. Sci. 43A, 255 (1956).

$Ag^{110}_{47\ 63}$ 24^s g.s.

β^-	100%	**2.869** *20*		S77
No other β (<5%), no γ, no $\beta\gamma$				S77, scin

R.F.Thomas,Jr., W.A.Whitaker, C.L.Peacock, Bull. Am. Phys. Soc. 1, No. 2, 86, D3 (1956), verbal report.

$Ag^{110}_{47\ 63}$ 270^d

β^-	55%	**0.086** *5*			S77
	43%	**0.536** *5*	No other β (<0.1%)		
$\gamma(Ag^{110})$ ~2%		**0.116** *2*	K/LM = 1.07		S77 ce
$\gamma(Cd^{110})$		**0.447** *5*			S77 pe,ce;
		0.575 *5*	~7†	**0.820** *8*	scin
		0.620 *6*	100†	**0.883** *9*	
	100†	**0.656*** *6*	55†	**0.945** *9*	
		0.685 *7*	30†	**1.382** *13*	
		0.705 *7*		**1.492** *15*	
		0.759 *7*		**1.519** *15*	

*K/LM = 11 (0.656γ)(all strong γ's)

R.F.Thomas,Jr., W.A.Whitaker, C.L.Peacock, Bull. Am. Phys. Soc. 1, No. 2, 86, D3 (1956).

$\gamma(Cd^{110})$ S77 Cp

100†	**0.60 to 0.75**
87†	**0.85 to 1.00**
22.5†	**(1.39)**
14.6†	**(1.48 + 1.51)**

B.S.Dželepov, J.V.Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956); Doklady Akad. Nauk SSSR 77, 597 (1951).

$Ag^{110}_{47\ 63}$ Resonances $Ag^{(109)}(n;\ n,\gamma)$ pulsed n's

E_o(ev)	J	Γ_γ(mev)	Γ_n(mev)
5.22	1	158 *11*	12.1 *9*
30.7	1	142 *13*	6.7 *5*
41	1	137 *19*	5.0 *4*
56	0	144 *11*	36.3 *14*
71	1	162 *6*	27.8 *7*
88	0	140 *21*	18.8 *14*

E.R.Rae, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Resonance $Ag^{(109)}(n)$

(5.2 ev) $\Gamma_\gamma = 136$ *6* mev

R.E.Wood, quoted by H.H.Landon, Phys. Rev. 100, 1414 (1955).

Resonances $Ag^{(109)}(n;\ n,\gamma)$ pulsed n's; scin

E_o(ev)	$\sigma_o\Gamma$	Γ(Mev)	$g\Gamma_n$(mev)
30.5	250	120	7.8
40.5	249	~50	7.7
55.9			11
71.2			24
88.0			5.2

For unassigned Ag resonances, see Ag

J.Rainwater, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); G. Grimm et al., Phys. Rev. 98, 1161A (1955); W. W.Havens et al., Bull. Am. Phys. Soc. 1, No.4 177 P15 (1956);verbal report.

$Ag^{115}_{47\ 68}$ 21^m

p 2.3^{d}Cd (92.3%) U(~150-Mev p) chem
p 43^{d}Cd (7.7%) U(~200-Mev d) chem

H.G.Hicks, R.S.Gilbert, Phys. Rev. 100, 1286 (1955).

Cd 48

Levels Cd(n,n') E_n = 2.45 pulsed n's

σ(90°)	Level
40 5	0.64 5
31 4	1.36 3
31 4	1.49 3

σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956); Bull. Am. Phys. Soc. 1, No. 1, 56 R10 (1956).

γ Cd(n,n'γ) E_n = 5.1 scin

0.52 2
2.80 2

I.L.Morgan, Phys. Rev. 103, 1031 (1956).

Resonances Cd(n) E_n = 14.5 to 11000 ev chopper

Isotope	E_o(ev)	Isotope	E_o(ev)
114	18.0		
112	27.4	112	86.4
114	63.6		90.0
	66.8	112	99.8
114	85.4	114	108.7

Resonances also observed at 120.1, 139, 164, 192, 215, 225, 233, 259, 305, 387, 437, 500, 650 ev

Isotopic assignments made by using samples enriched in Cd^{111} and depleted in Cd^{113}

P.B.Simpson, R.G.Fluharty, Bull. Am. Phys. Soc. 1, No. 5, 247 C4 (1956).

Resonances Cd(n) chopper

E_o(ev)	E_o(ev)
18.0	66.6
27.2*	88.2§

Assigned to *Cd^{112}, §Cd^{111} q.v.

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

Cd ? 48

Unassigned ce Ag(50-Mev p) chem

		sπ ce
0.06065		
0.12345	0.5597	0.6312
0.12461	0.5949	0.6599
0.15437	0.6005	0.6645
0.15832	0.6009	0.6691
0.2285	0.6048	0.6846
0.5338	0.6267	0.7337
0.5550	0.6291	0.7436

Assignable to Cd or daughter activities

F.A.Johnson, Can. J. Phys. 33, 841 (1955).

$Cd^{104}_{48\ 56}$ 59^m

τ 59^m 2 $Ag^{(107)}$(50-Mev p,4n) chem
No β^+ sl
γ(Ag^{104})

40*	0.0667	K/L_1 = 10	M1	sπ ce
500*	0.0836	K/L_1 = 8	M1	
		L_1:L_2:L_3 = 60:2:1		
2*	0.1236			
2*	0.1342			

*Relative ce_K intensities

F.A.Johnson, Can. J.Phys. 33, 841 (1955); Proc. Roy. Soc. Canada 46, 135A (1952).

τ 54^m 1 Ag(480-Mev p) chem

B.V.Kurchatov, V.N.Mekhedov, N.I.Borisova M.Y.Kuznetsova, L.N.Kurchatova, L.V. Christyakov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 178 July (1955); Consultants Bureau Trans. p. 111.

$Cd^{109}_{48\ 61}$ 470^d

γ continuum limit of 0.423 retracted

G.Bertolini, A.Gallone, E.Lazzarini, Nuovo Cim. 2, Suppl. No. 3, 123 (1955); priv. comm.

$Cd^{111}_{48\ 63}$

0.247 level $2.8^d In^{111}$ source
μ −0.783 23 γγ(θ,H)
Method independent of quadrupole interaction

R.M.Steffen, W.Zobel, Phys. Rev. 103, 126 (1956); 97, 1188 (1955).

Levels Cd^{111}(p,p'γ) E_p = 3.0 scin

0.342 level

γ	13%	0.092	
	13%	0.250	
	87%	0.342	B(E2) = 0.10

(0.092γ)(0.250γ)

0.610 level

γ	2% {	0.270		0.092
		0.360		0.250
	98%	0.610	B(E2) = 0.12	0.342

(0.270γ)(0.342γ) (0.360γ)(0.250γ)

F.K.McGowan, P.H.Stelson, M.M.Bretscher, Bull. Am. Phys. Soc. 1, No. 4, 164 C1 (1956); verbal report.

Level Cd^{111}(p,p'γ)
γ 0.342 E2/M1 = 0.152 p,γ(L)
B(E2) = 0.100

P.H.Stelson, F.K.McGowan, Bull. Am. Phys. Soc. 1, No. 4, 164 C2 (1956); verbal report.

Resonance Cd^{110}(n) chopper
88.2 ev Γ~0.34 ev σ_o = 19000
Γ_n~0.23 ev
Assumed Γ_γ = 0.12 ev

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

$Cd^{112}_{48\ 64}$ Resonance $Cd^{111}(n)$ chopper

27.2 ev $\Gamma = 0.130$ $\Gamma_n = 0.010$ $\sigma_o = 2400$ for $g = 1/4$

$\Gamma = 0.123$ $\Gamma_n = 0.003$ $\sigma_o = 2600$ for $g = 3/4$

Assumed $\Gamma_\gamma = 0.12$ ev

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

$Cd^{113}_{48\ 65}$ 5.1^y Cd^{112}(pile n,γ)

γ	~0.1†	0.265	E5	scin γ/β

Most K x rays observed ascribed to Cd^{109} scin

†Photons per 100 β

E. der Mateosian, M.Goldhaber, Bull. Am. Phys. Soc. 1, No. 4, 207 R6 (1956).

$Cd^{113}_{48\ 65}$ Levels $Cd^{113}(p,p'\gamma)$ $E_p = 3.3$

0.582 level scin

γ	16%	0.282
	16%	0.300
	84%	0.582

B(E2) = 0.276

(0.282 γ)(0.300 γ)

0.675 level

γ	2%	0.300
	2%	0.375
	98%	0.675

(0.375 γ)(0.300 γ)

F.K.McGowan, P.H.Stelson, M.M.Bretscher, Bull. Am. Phys. Soc. 1, No. 4, 164 C1 (1956); verbal report.

Level $Cd^{113}(p,p'\gamma)$

γ	0.300	E2/M1 = 0.084	p,γ(L)
		B(E2) = 0.100	

P.H.Stelson, F.K.McGowan, Bull. Am. Phys. Soc. 1, No. 4, 164 C2 (1956); verbal report.

$Cd^{114}_{48\ 66}$ Capture γ's $Cd^{(113)}$(th n,γ) sπ Cp

42†	0.56 *1*	2.5†	2.78 *2*	
14†	0.66 *1*		2.91 *3*	
7.5†	0.73 *1*		3.00 *3*	
2†	~0.76 *2*		~3.41 *4*	
7†	0.82 *1*		••	
4†	1.23 *1.5*	1†	5.07 *7*	
4†	1.31 *2*	2†	5.33 *7*	
5†	1.37 *2*	1†	5.50 *6*	
3†	1.42 *2*	1.8†	5.72 *10*	
3†	1.52 *2*	3.5†	5.97 *7*	
3†	1.63 *2*	1.3†	6.06 *10*	
2†	1.79 *2*		6.75 *5*	
	1.82 *2*	0.8†	6.91 *5*	

Continued

$Cd^{114}_{48\ 66}$ Continued

	1.87 *2*	0.2†	7.12 *5*	
	2.15 *3*	0.1†	~7.46 *5*	
	2.28 *3*	0.6†	7.71 *5*	
5†	2.45 *2*	0.5†	7.86 *5*	
4†	2.56 *2*	0.4†	8.48 *3*	
4†	2.68 *2*	0.2†	9.04 *3*	

Levels proposed at 0.55, 1.20, 1.28, 1.38, 1.85, 2.15, 2.28, 3.00, 3.08, 3.33, 3.55, 3.72, 3.98

••Lines not resolved

†Photons/100 Cd captures

B.P.Adyasevich, B.D.Groshev, A.M.Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

Capture γ's $Cd^{(113)}$(n,γ) scin Cp

100†	0.56 *2*	15†	2.53 *3**	
13†	1.32*	9†	3.27 *3**	

*Two or more unresolved γ's

T.H.Braid, Phys. Rev. 102, 1109 (1956).

$Cd^{116}_{48\ 68}$ $\tau_{\beta\beta}$ $>3 \times 10^{16}$y 81% Cd^{116}; Σ scin

From absence of counts from 2 to 3.5 Mev

J.F.Detoeuf, R.Moch, J. phys. radium 16, 897 (1955); Compt. rend. 241, 393 (1955).

In_{49} Relative isotopic abundances ms

In^{113} 4.33% *4*

In^{115} 95.67%

No In^{108}, In^{109}, In^{110}, In^{111} ($<2 \times 10^{-6}$%)

No In^{112} ($<4 \times 10^{-6}$%)

No In^{114} ($<2 \times 10^{-5}$%)

No In^{116} ($<1 \times 10^{-5}$%)

No In^{117}, In^{118} ($<8 \times 10^{-6}$%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

γ In(n,n'γ) E_n = 0.35 to 3.9

	0.26	scin
	0.50	1.11
	0.91	1.42

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$In^{107}_{49\ 58}$ 33^m

τ	~30^m	/ Cd^{106}(7.8-Mev d,n)	chem
β^+	~2		scin
$\gamma(Cd^{107})$	0.22		scin $\beta\gamma$, scin
$\beta(0.22\gamma)$			

W.A.Cassatt, Jr., W.W.Meinke, Phys. Rev. 100, 1372 (1955).

$In^{111}_{49\ 62}$ 2.8^d

$\gamma(Cd^{111})$ **(0.172)** E2/M1 = 0.016 $\gamma\gamma(\theta)$
(0.247) E2 = 100%
(0.172 $\gamma\gamma$)(0.247 $\gamma\gamma(\theta)$ J = 7/2, 5/2, 1/2
$\gamma\gamma(\theta)$, $ce_K\gamma(\theta)$, $\gamma ce_K(\theta)$, $ce_K ce_K(\theta)$

F. Gimmi, E. Heer, P. Scherrer, Helv. Phys. Acta, 29, 147 (1956); 27, 180A (1954); Z. Phys. 138, 394 (1954).

$\gamma(Cd^{111})$ $Ag^{(109)}(\alpha, 2n)$ chem; scin
(0.172) E2/M1 = 0.021 2 $\gamma\gamma(\theta)$
(0.247) E2
(0.172 $\gamma\gamma$)(0.247 $\gamma\gamma(\theta)$ J = 7/2, 5/2, 1/2
$\eta(\pi) = -0.248$ *3*
Effect of extranuclear fields on $\gamma\gamma(\theta)$ studied

R. M. Steffen, Phys. Rev. 103, 116 (1956).

(0.172 $\gamma\gamma$)(0.247 $\gamma\gamma$)(θ) scin
Effect of ϵ_K on time-dependent angular correlation coefficient shown

P. Lehmann, J. Miller, J. Phys. Radium 17, 526 (1956).

(0.172 $\gamma\gamma$)(0.247 $\gamma\gamma$) delay = $84.9^{m\mu s}{}^{+13}_{-5}$ scin

P. C. Simms, R. M. Steffen, Bull. Am. Phys. Soc. 1, No. 4, 207 R5 (1956).

(0.172 $\gamma\gamma$)(0.247 $\gamma\gamma$) delay = $85^{m\mu s}$ 2

L. H. Rietjens, H. J. Van den Bold, A. Heyligers, Physica 21, 899 (1955).

$In^{113}_{49\ 64}$ 1.7^h

γ **(0.392)** α = 0.39 4 GM
Authors conclude γ is E5

I. V. Estulin, E. M. Moiseeva, Soviet Phys. JETP 1, 463 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 541 (1955).

$In^{114}_{49\ 65}$

0.192 level
J 5 M
μ +4.7 5*

L. S. Goodman, S. Wexler, Phys. Rev. 100, 1245A (1955); *verbal report.

$In^{114}_{49\ 65}$ 72^s g.s.

$Cd^{114}(p,n)$, $Cd^{114}(d,2n)$, 50^d In source
β^- **0.674** *40* scin $\beta\gamma$
β^+ 0.004% **0.400** *25* scin $\gamma^{\pm}\gamma^{\pm}\beta^+$
ϵ_K 1.9% scin x/β in 72^s and 50^d In
$\gamma(Sn^{114})$
0.09% **1.300** *40* scin $\beta\gamma$, scin γ
(0.674β)(1.30γ) scin
No (K x ray)(0.556, 0.722γ)
$\epsilon_K(72^s)/\epsilon_K(50^d)$ to 1.278 level in $Cd^{114} \leq 0.02$
x(0.722γ)/x in 72^s and 50^d In

L. Grodzins, H. Motz, Phys. Rev. 102, 761 (1956); 100, 1236A (1955).

$In^{114}_{49\ 65}$ 72^s g.s.

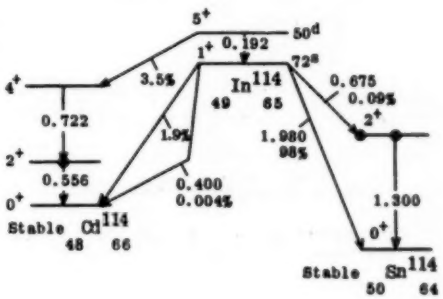
$50^d In^{114}$ source
β^- 0.2% **0.71** *5* scin $\beta\gamma$
$\gamma(Cd^{114})$ **(0.556)**
$\gamma(Sn^{114})$
0.2% **1.299** *2* sd pe
(0.71β)(1.299γ) No (0.556γ)(1.299γ) scin
No 0.576γ (< 0.03%) No 1.271γ (< 0.01%)

M. W. Johns, I. R. Williams, D. E. Brodie, Can. J. Phys. 34, 147 (1956).

$In^{114}_{49\ 65}$ 50^d

$\gamma(In^{114})$ **(0.192)** In^{113}(pile n,γ); scin
$\gamma(Cd^{114})$
100† **0.556**
100† **0.722**
(0.556 $\gamma\gamma$)(0.722 $\gamma\gamma$) No 0.572, 1.278γ
No (0.556 $\gamma\gamma$)(1.30 $\gamma\gamma$; 1.30γ assigned to $72^s In^{114}$
No (K x ray)(1.30γ)

$In^{114}_{49\ 65}$



L. Grodzins, H. Motz, Phys. Rev. 102, 761 (1956); 100, 1236A (1955).

(0.556 $\gamma\gamma$)(0.722 $\gamma\gamma(\theta)$) } J = 4^+, 2^+, 0^+ scin
(0.556 $\gamma\gamma$)(0.722 $\gamma\gamma$(L.)) }
$\gamma\gamma(\theta)$ found not to be influenced by physical and chemical state of source
No 0.556, 0.722γ in $72^s In^{114}$ scin

J. N. Brazos, R. M. Steffen, Phys. Rev. 102, 753 (1956); R. M. Steffen, L. M. Noble, Bull. Am. Phys. Soc. 1, No. 1, 42, K5 (1956).

Resonances $In^{(113)}(n)$ chopper

E_o(ev)	Γ_n(mev)*	E_o(ev)	Γ_n(mev)*
14.67 *23*	7.5 *8*	**25.0** *5*	**10.0** *15*
19.7 *3*		**32.3** *7*	**10.2** *22*
21.4 *4*	2.5 *6*	**70.0** *24*	**29** *10*

*Assuming Γ = 80 mev

J. A. Radkevich, V. V. Vinuimirsky, V. V. Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$In^{114}_{49\ 65}$? γ $In^{(115)}(\gamma,n\gamma)$ $E_\gamma \leq 22$; scin
0.312 *15* $\gamma\gamma$ delay = 42^{ns} 5
Threshold = 9.93 *10*

S. H. Vegors, Jr., R. B. Duffield, Bull. Am. Phys. Soc. 1, No. 4, 206 R1 (1956); verbal report.

$In^{115}_{49\ 66}$ **ground state**

μ_I **0.31** *1*

Calculated using data of P. Kusch, T.G. Eck*

C. Schwartz, Phys. Rev. 97, 380 (1955); *P. Kusch, T.G. Eck, Phys. Rev. 94, 1799 (1954).

$In^{115}_{49\ 66}$ γ **(0.335)** K/LM = 3.75 *15* sl

ω_K = 0.87 *3* found from e_{AK}/ce_K 4.5^h

J. Laberrigue-Frolow, P. Radvanyi, Compt. rend. 242, 901 (1956).

γ **(0.335)** α = 0.90 *6* GM

Authors conclude γ is E5

I.V. Estulin, E.M. Moiseeva, Soviet Phys. JETP 1, 463 (1955); Zhur. Eksptl' i Teoret. Fiz. 28, 541 (1955).

$In^{115}_{49\ 66}$ Levels $In^{(115)}(\gamma,\gamma')4.5^h$ In^{115}

2† **1.02** E_γ = 1.1 to 2

10† **1.45**

†$\int\sigma dE$ in units of 10^{-33} Mev-cm^2

J.L. Burkhardt, E.J. Winhold, T.H. Dupree, Phys. Rev. 100, 199 (1955).

Level $In^{(115)}(\alpha,\alpha'\gamma)$ E_α = 7 to 20

1.5 scin 0.335 γ

R.R. McLeod Phys. Rev. 100, 1265A (1955).

γ $In^{(115)}(p,p'\gamma)$ $E_p \sim 30$; scin

0.512 *12*

Yield as $f(E_p)$ incompatible with E2 excitation

A.S. Divatia, R.H. Davis, R.D. Moffat, D.A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

$In^{116}_{49\ 67}$ **54^m level** $In^{(115)}$(pile n,γ)

J **5** M

μ **+4.21** *8*

P.B. Nutter, Phil. Mag. 1, 587 (1956).

54^m level

J **5** M

μ **+4.4** *4**

L.S. Goodman, S. Wexler, Phys. Rev. 100, 1796A (1955); *verbal report.

$In^{116}_{49\ 67\ 54^m}$ $\gamma(Sn^{116})$ $In^{(115)}$(slow n,γ)

0.137				scin
0.40	E2/M1 = 24			
0.80	E2/M1 = 9			
1.09	E2	**1.48**	E2	
1.27	E2	**2.09**	E2	

(1.09 $\gamma\gamma$)(1.27 $\gamma\gamma$)(θ) J = 4, 2, 0

(1.48 $\gamma\gamma$)(1.27 $\gamma\gamma$)(θ) J = 4, 2, 0

(0.80 $\gamma\gamma$)(1.27 $\gamma\gamma$)(θ) J = 2, 2, 0

(0.40 $\gamma\gamma$)(2.09 $\gamma\gamma$)(θ) J = 2, 2, 0

R.P. Scharenberg, M.G. Stewart, M.L. Wiedenbeck, Phys. Rev. 101, 689 (1956).

$In^{116}_{49\ 67}$ Resonances $In^{(115)}$(n,) chopper

E_o(ev)	Γ_n(mev)*	E_o(ev)	Γ_n(mev)*
9.00 *11*	1.74 *43*		
12.0 *2*	0.116 *10*	**63** *2*	
22.8 *4*	1.35 *19*	**84.2** *30*	13.2 *45*
39.8 *10*	4.1 *8*	**95** *4*	2.2 *9*
47.9 *13*	0.98 *30*	**129** *6*	

*Assuming $\overline{\Gamma}_\gamma$ = 80 mev

J.A. Radkevich, V.V. Vladimirsky, V.V. Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956: Physica 22 (1956); verbal report.

Sn_{50} Level $Sn(n,n')$ E_n = 2.45

σ(90°)	Level	pulsed n's
47 *3*	**1.24** *3*	σ units: mb/sterad

L. Cranberg, J.S. Levin, Phys. Rev. 103, 343 (1956).

Sn_{50} ? γ $Sn(\gamma,?\gamma)$ $E_\gamma \leq 22$; scin

0.503 *15* $\gamma\gamma$ delay = 165$^{\mu s}$ *15*

S.H. Vegors, Jr., R.B. Duffield, Bull. Am. Phys. Soc. 1, No. 4, 206 R1 (1956); verbal report.

$Sn^{110}_{50\ 60}$ τ $4.1^{h*}{}_2$ Cd^{108}(32-Mev α,2n) chem

$\gamma(In^{110})$ **0.285** scin, sl ce

p $66^m In^{110}$ 4.1^h

S.W. Mead, M.D. Petroff, W.O. Doggett, Phys. Rev. 100, 1794A (1955); *verbal report.

$Sn^{113}_{50\ 63}$ τ **130^d** *3* Sn^{112}(pile n,γ)

$\gamma(In^{113})$ 118^d

12† **0.258** scin

100† **0.393**

G. Gardner, J.I. Hopkins, Phys. Rev. 101, 999 (1956).

$Sn^{113}_{50\ 63}$ τ **119^d** *3* GM x/ce
118^d
$\epsilon_L/\epsilon_K = 0.17 \pm 0.12$ from $\epsilon_K = 85\%$ *10*
No γ with $0.028 < E_\gamma < 0.10$ ($< 0.03\%$) pc
No ce 0.0858γ (< 0.01 of ce_K 0.392γ) sl
No 0.255γ ($< 1\%$) no 0.401γ ($< 10\%$) scin, sl

P. Avignon, Ann. Phys. 1, 10 (1956); Y. Deschamps, P. Avignon, Compt. rend. 236, 478 (1953).

E_ϵ **0.10** *1* (K x ray)(continuum γ)

R. G. Jung, M. L. Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).

$Sn^{115}_{50\ 65}$ $Sn^{115}(\alpha, \alpha'\gamma)$ $E_\alpha = 4.5$
No γ observed scin

L. W. Fagg, E. H. Geer, E. A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$Sn^{117}_{50\ 67}$ Sn^{116}(pile n, γ)
14^d
γ **(0.161)** E2/M1 = 0.0015 (+*15*, −*10*)
(ce_K 0.159γ)(0.161γ)(θ); sl, scin

R. K. Golden, S. Frankel, Phys. Rev. 102, 1053 (1956); 95, 613A (1954).

$Sn^{117}_{50\ 67}$ $Sn^{117}(\alpha, \alpha'\gamma)$ $E_\alpha = 4.5$
No γ observed scin

L. W. Fagg, E. H. Geer, E. A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$Sn^{119}_{50\ 69}$ $Sn^{119}(\alpha, \alpha'\gamma)$ $E_\alpha = 4.5$
No γ observed scin

L. W. Fagg, E. H. Geer, E. A. Wolicki, Bull. Am. Phys. Soc. 1, No. 4, 165 C4 (1956); verbal report.

$Sn^{127}_{50\ 77}$ $Te^{(130)}$(n, α) chem
2.0^h
τ **2.05^h** *5* p 4^dSb

H. Carminatti, I. Fraenz, R. Radicella, J. Rodriguez, Z. Naturf. 11a, 419 (1956).

$Sn^{130}_{50\ 80}$? τ **2.6^m** *3* U(n, f) chem
2.6^m
From milking of 10^mSb

A. C. Pappas, D. R. Wiles, J. Inorg. Nuclear Chem. 2, 69 (1956).

$Sn^{131}_{50\ 81}$ τ **3.4^m** *5* U(n, f) chem
3.4^m
From milking of 23^mSb

A. C. Pappas, D. R. Wiles, J. Inorg. Nuclear Chem. 2, 69 (1956).

$Sn^{132}_{50\ 82}$ τ **2.2^m** *3* U(n, f) chem
2.2^m
From milking of 2.1^mSb

A. C. Pappas, D. R. Wiles, J. Inorg. Nuclear Chem. 2, 69 (1956).

Sb_{51} γ Sb(n, n'γ) $E_n = 3.7$; scin
1.00 *4* $\sigma(90°) = 75$ mb/sterad

M. A. Rothman, H. S. Hans, C. E. Mandeville, Phys. Rev. 100, 83 (1955).

$Sb^{116}_{51\ 65}$ β^+ **2.3** *3* a
15.5^m
g.s.

A. H. W. Aten, Jr., Physica 22, 288 (1956); 20, 665 (1954).

$Sb^{119}_{51\ 68}$ τ **38.0^h** d $4.5^d$$Te^{119}$ chem
39^h
ϵ **0.563** *10* scin γ continuum
$\gamma(Sn^{119})$ **0.02383*** *3* $\alpha = 6.3$ *4* 8π ce
$L_1/L_2L_3 > 3^*$ M1
(K x ray)(0.024γ) delay = $18.5^{m\mu s}$

J. L. Olsen, L. G. Mann, M. Lindner, Bull. Am. Phys. Soc. 1, No. 1, 41, K2 (1956); *J. M. Hollander, ibid.

$Sb^{122}_{51\ 71}$ $\gamma(Te^{122})$ **0.56393** *19* cryst
2.75^d
g.s.

N. Ryde, B. Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

$\beta(0.57\gamma)$ delay = $150^{m\mu s}$ *20* scin

C. F. Coleman, Phil. Mag. 46, 1135 (1955).

$Sb^{122}_{51\ 71}$ Resonances Sb^{121}(n) chopper

$\sigma_o(10^3 b)$	E_o(ev)	Γ(mev)	Γ_n(mev)
10.8†	6.25	62†	3.2†
11.9	15.6	70	10.0
5.2	29.8	68	8.2
1.4	53.5	64	3.7
0.36	64.0	61	1.1
2.9	74.0	72	11.9
5.8	90	102	41

For 6.25 ev resonance, $\Gamma_\gamma = 60 \pm 20$ mev
For other resonances $\Gamma_\gamma = 60$ mev was assumed
Values assuming $\Gamma_\gamma = 100$ mev are also given

R. R. Palmer, L. M. Bollinger, Phys. Rev. 102, 228 (1956).

$Sb^{124}_{51\ 73}$ 54^{d} g.s.

τ 53.7^{d} 8 differential ic

B.S.Dzhelepov, O.E.Kraft, Vestnik-Leningrad Univ., Ser. Mat. Piz. Khim. No. 8, 97 (1955); Chem. Abstr. 50, No. 12675e (1956).

$\gamma(Te^{124})$	(0.603)	40†	1.052	sπ Cp
1270†	(0.650)	147†	1.347	
259†	(0.714)	1000†	(1.708)	
64†	0.958	130†	(2.062)	

B.S.Dželepov, J.V.Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956); Doklady Akad. Nauk SSSR 86, 255 (1952).

$Sb^{124}_{51\ 73}$

Resonances Sb^{123}(n) chopper

$\sigma_o(10^3 b)$	E_o(ev)	Γ(mev)	Γ_n(mev)
21.00	21.6	92	32
2.48	50.5	66	6.5
4.35	76.5	80	20
6.70	105	131	71

Assuming Γ_γ= 60 mev
Values assuming Γ_γ= 100 mev are also given

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

$Sb^{125}_{51\ 74}$ 2.0^{y}

$Sn^{(124)}$(pile n,$\gamma\beta$) chem

τ 2.0^{y} 2

$\gamma(Te^{125})$				
1.4†	0.113			scin γ
19†	0.175			
0.6†	0.175			scin $\gamma\gamma$
0.8†	0.205			
0.6†	0.214			
0.88†	0.320			
3.8†	0.377			scin γ
100†	0.427	88†	0.595	
31†	0.463	23†	0.637	

(K x ray)(0.427, 0.595γ)
(0.133 γ)(0.2, 0.37 γ)
(0.175 γ)(0.113, 0.205, 0.320 γ)
(0.427 γ)(0.175, 0.214 γ)
(0.463 γ)(0.175, 0.214 γ)
No 0.140, 0.342 γ

N.H.Lazar, Phys. Rev. 102, 1058 (1956).

$Sb^{127}_{51\ 76}$ 93^{h}

$Te^{(128)}$(γ,p) chem; $E_\gamma \leq 70$

β^-	50%	0.86 2			scin
	20%	1.11 3			
	30%	1.57 3			
$\gamma(Te^{127})$		0.058 10	st	0.456 4	scin
		0.185 8		0.563 5	
	st	0.240 3	st	0.674 5	
		0.417 8		0.764 10	

(0.86 β)(0.674 γ) (1.11 β)(0.456 γ)

M.C.Day,Jr., A.F.Voigt, Phys. Rev. 101, 1784 (1956).

$Sb^{129}_{51\ 78}$ 4.6^{h}

$Te^{(130)}$(γ,p) chem; E_γ = 70

β^-	20%	1.87 5*		scin
$\gamma(Te^{129})$		0.165 5	0.534 3	scin
		0.308 4	0.788 5	

*Also other β^- groups with $E_\beta < 1.87$

M.C.Day,Jr., A.F.Voigt, Phys. Rev. 101, 1784 (1956).

$Sb^{130?}_{51\ 79}$ 10^{m}

τ 9.2^{m} 3 d 2.6^{m}Sn chem

A.C.Pappas, D.R.Wiles, J. Inorg. Nuclear Chem. 2, 69 (1956).

$Sb^{132}_{51\ 81}$ 2.1^{m}

τ 2.1^{m} 2 d 2.2^{m}Sn chem

A.C.Pappas, D.R.Wiles, J. Inorg. Nuclear Chem. 2, 69 (1956).

Te 52

Level Te(n,n') E_n = 2.45

σ(90°)	Level	
55 6	0.72 5	pulsed n's

σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

$Te^{120}_{52\ 68}$

Level $Te^{120}(\alpha,\alpha'\gamma)$ E_α = 6.5

γ 0.560 $\tau = 9.4^{\mu\mu s}$ scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Te^{121}_{52\ 69}$ 154^{d}

γ $Sb^{(121)}$(15-Mev d,2n) chem

0.0818		sl ce
0.214	E2/M1 = 0.059	scin,sl ce

(ce_K 0.082 γ)(0.214 γ)(θ) sl ce,
(ce_L 0.082 γ)(0.214 γ)(θ) scin
(ce_K 0.082 γ)(ce_K 0.214 γ)(θ)
Results compatible with J = 11/2, 3/2, 1/2

N.Goldberg, S.Frankel, Phys. Rev. 100, 1350 (1955); 93, 1425 (1954).

γ (0.214) α_K = 0.072 3 sl ce
K/L = 6.3 3

N.Goldberg, Bull. Am. Phys. Soc. 1, No. 4, 207 R7 (1956).

$Te^{122}_{52\ 70}$

Level $Te^{122}(\alpha,\alpha'\gamma)$ E_α = 6.5

γ 0.570 $\tau = 10^{\mu\mu s}$ scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Te^{123}_{52\ 71}$ 104^d

γ		$Sb^{(123)}$(15-Mev d,2n) chem	
	0.0887		sl ce
	0.159	E2/M1 = 0.013	scin,sl ce
$(ce_K\ 0.089\gamma)(0.159\gamma)(\theta)$			sl ce,
$(ce_L\ 0.089\gamma)(0.159\gamma)(\theta)$			scin
$(ce_K\ 0.089\gamma)(ce_K\ 0.159\gamma)(\theta)$			

Results compatible with J = 11/2, 3/2, 1/2

N.Goldberg, S.Frankel, Phys. Rev. 100, 1350 (1955); 93, 1425 (1954).

γ	**(0.159)**	α_K = 0.165 *5*	sl ce
		K/L = 6.6 *3*	

N.Goldberg, Bull. Am. Phys. Soc. 1, No. 4, 207 R7 (1956).

$Te^{123}_{52\ 71}$

Levels $Te^{123}(p,p'\gamma)$ E_p = 3.7; scin
$Te^{123}(\alpha,\alpha'\gamma)$ E_α = 4.0; scin

0.159 level

γ **0.159** *2* B(E2) = 0.018 (α = 0.21)

0.436 level		0.504 level	
γ	**0.159** *2*	γ	**0.159** *2*
	0.274 *3*		**0.342** *3*
	0.436 *5*		**0.504** *5*

(0.274γ)(0.159γ) (0.342γ)(0.159γ)
No (0.274γ)(0.342γ) No 0.068γ

L.W.Fagg, E.A.Wolicki, R.O.Bondelid, K.L. Dunning, S.Snyder, Phys. Rev. 100, 1299; 98, 1538A (1955).

$Te^{124}_{52\ 72}$

Level $Te^{124}(\alpha,\alpha'\gamma)$ E_α = 6.5
γ **0.608** $\tau = 8.8^{\mu\mu s}$ scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Capture γ $Te^{(123)}(n,\gamma)$ E_n = 2.33 ev
~50† **(0.600)** scin
†Photons/100 Te^{123} captures

R.G.Bennett, A.E.Walters, C.A.Fenstermacher, L.Rosler, Bull. Am. Phys. Soc. 1, No. 1, 62, UA5 (1956).

$Te^{125}_{52\ 73}$

$Te^{125}(n,n'\gamma)$ E_n = 4.4
No γ observed scin

R.M.Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No.1,42 K3 (1956).

γ $Te^{125}(p,p'\gamma)$ E_p = 3.0

0.435	B(E2) = 0.44*	scin
0.633	= 0.26$	

Assuming γ cascade from level at *0.47, $0.67

L.W.Fagg, E.A.Wolicki, R.O.Bondelid, K.L. Dunning, S.Snyder, Phys. Rev. 100, 1299; 98, 1538A (1955).

Level $Te^{126}(\alpha,\alpha'\gamma)$ E_α = 6.5
γ **0.662** $\tau = 7.0^{\mu\mu s}$ scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Te^{126}_{52\ 74}$

γ		$Te^{126}(n,n'\gamma)$	E_n = 4.4
60†	**0.68** *2*		scin
20†	**1.38** *4*		

No 0.74γ (<0.03†)
†Photons/100 0.83γ's from $Te^{130}(n,n'\gamma)$

R.M.Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42 K3 (1956).

$Te^{127}_{52\ 75}$ 9.4^h s.s.

τ	**9.35^h** *2*	d	^{93h}Sb from U(n,f), $Te^{126}(n,\gamma)$ chem
β^-	**0.695** *10*		sl
$\gamma(I^{127})$ 6†	**0.0585** *1*	α = 1.95*	sl,scin
0.8†	**0.145** *2*		scin $\gamma\gamma$
11†	**(0.203** *3*)		scin
	(0.215 *4*)		
15†	**0.360** *4*		
100†	**0.418** *2*		

0.418γ/100β = 0.8 *1* No 0.170γ (<0.32†)
(0.360γ)(K x ray, 0.059γ)
(0.059γ)(0.155$, 0.208, 0.360$\gamma$)
(0.208γ)(0.145, 0.208γ)
*Using α = 0.025, 0.4 for 0.360γ, 0.145γ resp.
$From overlap of 0.145$\gamma$ and Cp peak of 0.360γ

J.D.Knight, J.P.Mize, J.W.Starner, J.W.Barnes, Phys. Rev. 102, 1592 (1956).

		$Te^{(128)}(\gamma,n)$	chem
β^-	**0.683** *10*		scin

No γ

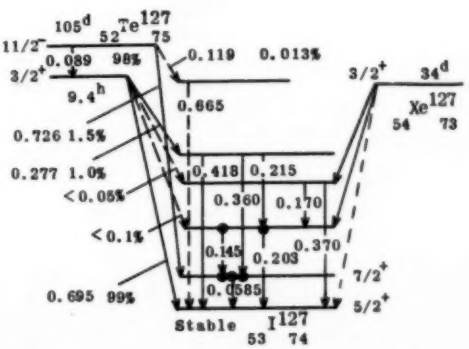
M.C. Day, Jr., G.W. Eakins, A.F. Voigt, Phys. Rev. 100, 796 (1955).

β^- **0.72** *5* F-K linear sπ ppl

P.Kleinheins, Z. Naturf. 11a, 252 (1956).

$Te^{127}_{52\ 75}$ 105^d

τ	**105^d** *2*	d	^{93h}Sb from U(n,f), $Te^{126}(n,\gamma\beta)$ chem
$\gamma(Te^{127})$ 13†	**0.089** *2*		scin
$\gamma(I^{127})$ 66†	**0.0585** *10*		
1.7†	**0.665** *5*		
x	**K x ray**		



J.D.Knight, J.P.Mize, J.W.Starner, J.W. Barnes, Phys. Rev. 102, 1592 (1956).

$Te^{128}_{52\ 76}$

Level	$Te^{128}(n,n'\gamma)$	$E_n = 4.4$
γ 70†	**0.76** *2*	scin

†Photons/100 0.83γ's from $Te^{130}(n,n'\gamma)$

R.M.Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42, K3 (1956).

Level	$Te^{128}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.5$
γ	**0.750** $\tau = 4.2^{\mu\mu s}$	scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Te^{129}_{52\ 77}$ 74^m g.s.

τ	74^m	Te^{128}(11.5-Mev d,p)	chem
β^- 10%	**0.29** *6* 15%	**0.989** *20*	sl
4%	**0.69** *10* 71%	**1.453** *5*	
$\gamma(I^{129})$	**0.0268**		scin, sl ce
	0.475 *5*		scin
	~**0.77**		
	1.12 *2*		

ce 0.0268γ/β~0.23 sl

W.E.Graves, A.C.G.Mitchell, Phys. Rev. 101, 701 (1956); 100, 1236A (1955).

		$Te^{(130)}(\gamma,n)$	chem
β^- ~20%	**1.01** *2*		scin $\beta\gamma$
~80%	**1.46** *1*		scin
$\gamma(I^{129})$	~**0.035**		
	0.450 *5*		

(1.46β)(~0.035γ) (1.01β)(0.45γ)
(~0.035γ)(0.45γ) No 0.485γ

M.C. Day, Jr., G.W. Eakins, A.P. Voigt, Phys. Rev. 100, 796 (1955).

$\gamma(I^{129})$ 10†	**0.460** *10*	scin
w	**0.775*** *20*	
1†	**1.070** *20*	

No γ with $0.15 < E_\gamma < 0.45$
*Assignment uncertain

T.Stribel, Z. Naturf. 10a, 797 (1955).

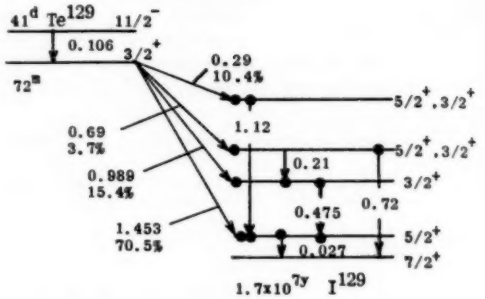
$Te^{129}_{52\ 77}$ $41^d + 74^m$

τ	41^d	Te^{128}(11.5-Mev d,p)	chem
β^- 13%	**0.35** *6* 16%	**0.972** *20*	sl
3%	**0.66** *10* 68%	**1.530** *5*	
$\gamma(Te^{129})$	**0.1063** *1*		s ce
$\gamma(I^{129})$	**0.0268**		scin, sl ce
	0.21 *1*	**0.72** *1*	scin
	0.475 *5*	**1.14** *2*	

(0.35β)(1.14γ) (0.66β)(0.72γ) scin
(0.97β)(0.475γ) (1.5β)(0.027γ)*
(0.027γ)(0.475, 1.14γ) (0.21γ)(0.475γ)
Ce 0.106γ/β = 0.95 sl
*F-K end point gave $E_\beta = 1.45$

Continued

$Te^{129}_{52\ 77}$ Continued



W.E.Graves, A.C.G.Mitchell, Phys. Rev. 101, 701 (1956); 100, 1236A (1955).

$Te^{130}_{52\ 78}$

Level	$Te^{130}(n,n'\gamma)$	$E_n = 4.4$
γ st	**0.83**	scin

R.M.Sinclair, Phys. Rev. 102, 461 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42, K3 (1956).

Level	$Te^{130}(\alpha,\alpha'\gamma)$	$E_\alpha = 6.5$
γ	**0.850** $\tau = 2.4^{\mu\mu s}$	scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Te^{132}_{52\ 80}$ 78^h

τ	**75**^{h} *3*	U(n,f), Pu(n,f)
		Xe^{132}/Xe^{134} as f(t),ms

W.H.Fleming, H.G.Thode, Can. J.Chem. 34, 408 (1956).

I_{53}

Relative isotopic abundance

No I^{129} ($< 10^{-6}$%) from absence of $12.5^h I^{130}$ after neutron irradiation of iodine

B.C.Purkayastha, G.R.Martin, Can. J. Chem. 34, 293 (1956).

$I^{127}_{53\ 74}$

ground state

$|\mu_3|$ **0.17** *3*

Recalculated using data of V.Jaccarino et al.*

C.Schwartz, Phys. Rev. 97, 380 (1955); *V. Jaccarino et al., Phys. Rev. 94, 1798 (1954).

$I^{127}_{53\ 74}$

γ $I^{127}(\alpha,\alpha'\gamma)$ scin

0.060 2
0.201 4

γ $I^{127}(p,p'\gamma)$ E_p=3.20; scin

0.208 7 B(E2) = 0.044 (α = 0.14)
0.392* 8
0.438 10 B(E2) = 0.0061
0.631 10 = 0.116
0.751 25 = 0.074
0.94* 5

*Yield as f(E_p) incompatible with E2 excitation

A.S.Divatia, R.H.Davis, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

γ $I^{127}(n,n'\gamma)$ E_n = 0.80

0.134 20 scin
0.21 2 0.62 2
0.42 2 0.78 2

I.L.Morgan, Phys. Rev. 103, 1031 (1956).

γ $I^{127}(n,n'\gamma)$ E_n = 2.5

~0.2 0.64 5 scin
~0.41 1.01 5

E.Wolf, Phil. Mag. 1, 102 (1956).

$I^{128}_{53\ 75}$ 25^m

I^{127}(slow n,γ) chem

β^- 2.0% 1.125 20 1.665β - 0.540γ, sl
15.5% 1.665 15 sl
76.0% 2.120 10
No β^+ sl, scin
γ(Te^{128})
0.31% 0.750 7 scin
γ(Xe^{128})
17.2% 0.455 5 scin
1.8% 0.540 5 0.29% 0.990 10
β^-/0.455γ = 5.0 ± 0.5 sl, scin
ϵ_K/0.455γ = 0.316 Te K x ray/0.455γ pc, scin
Total ϵ decay is 6.4% assuming ϵ_L/ϵ_K = 0.1
(0.455γ)(0.540γ) scin
(0.750γ)(Te x rays)

N.Benczer, B.Parrelly, L.Koerts, C.S.Wu, Phys. Rev. 101, 1027 (1956); 100, 955A (1955)

β^- ~1.6 scin$\beta\gamma$
~2.0 scin

γ(Xe^{128}) 0.428
(~1.6β)(0.428γ)

T.Stribel, Z. Naturf. 10a, 797 (1955).

γ(Xe^{128})* I^{127}(n,γ) chem; scin

100† 0.440 5
<1.5† 0.520
3† 0.960 15
γ(Te^{128})*
~0.5† 0.750

*Assignment from energy systematics of 2^+ states

R.K. Gupta, S.Jha, Nuclear Phys. 1, 2 (1956).

$I^{128}_{53\ 75}$

Capture γ's I^{127}(th n,γ)
st ~0.085 scin Cp
w 0.255
Study covered E_γ = 0.1 to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Resonances E_o(ev)	Γ_n(mev)*		I^{127}(n) E_o(ev)	chopper Γ_n(mev)*	
20.5 4	1.08	24			
31.4 6	15	3	66 2	14.5	65
38.1 9	36	7	79 3	37	16
46.0 12	21	6	92 4	21	11

*Assuming Γ_γ = 100 mev

J.A.Radkevich, V.V.Vladimirsky, V.V.Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

$I^{131}_{53\ 78}$ 8.05^d

γ(Xe^{131}) 0.08016 L_1/L_2~10 s77 ce
0.1638 1
0.1771 1

W.G.Smith, J.M.Hollander, Phys. Rev. 101, 746 (1956).

Xe 54

Relative isotopic abundances ms
No Xe^{119}, Xe^{120}, Xe^{121}, Xe^{122}, Xe^{123} ($< 10^{-6}$%)
No Xe^{125}, Xe^{127}, Xe^{138}, Xe^{140}, Xe^{141} ($< 2 \times 10^{-6}$%)
No Xe^{133}, Xe^{135} ($< 6 \times 10^{-6}$%)
No Xe^{137}, Xe^{139} ($< 3 \times 10^{-6}$%)

D.C.Hess, ANL-5420 (1956).

$Xe^{130}_{54\ 76}$

Level $Xe^{(130)}(\alpha,\alpha'\gamma)$ E_α = 6.5
γ 0.530 scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3, (1956); verbal report.

$Xe^{131}_{54\ 77}$ 12^d

Charges 1 to 21 (av.= 8.0) found on recoils
Charge distribution given s Xe^{131} recoil

A.H.Snell, F.Pleasonton, Bull. Am. Phys. Soc. 1, No. 1, 42, K6 (1956); verbal report.

$Xe^{131}_{54\ 77}$

γ $Xe^{(131)}(\alpha,\alpha'\gamma)$ E_α = 6.5
0.286 scin
0.364

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956).

$Xe^{132}_{54\ 78}$

Level $Xe^{(132)}(\alpha,\alpha'\gamma)$ E_α = 6.5
γ 0.670 scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Xe^{134}_{54\ 80}$ Level $Xe^{(134)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.5$

γ **0.870** scin

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$Xe^{136}_{54\ 82}$ Resonance $Xe^{135}(n)$ $E_n = 0.015$ to 0.20 ev

0.085 ev $\Gamma_n = 0.031$ cryst

$\Gamma_\gamma = 0.083$ for g = 3/8

σ_t(peak) = 3.3×10^4 $\Gamma_n = 0.018$

$\Gamma_\gamma = 0.094$ for g = 5/8

S.Bernstein, M.M.Shapiro, C.P.Stanford, T.E. Stephenson, J.B.Dial, S.Freed, G.W.Parker, A.R.Brosi, G.M.Hebert, T.W.DeWitt, Phys. Rev. 102, 823 (1956).

Cs Relative isotopic abundances ms

Cs^{133} **100.0%**

No Cs^{130} ($< 2 \times 10^{-6}$%) No Cs^{134} ($< 5 \times 10^{-5}$%)

No Cs^{131}, Cs^{136} ($< 1 \times 10^{-5}$%)

No Cs^{132}, Cs^{135} ($< 3 \times 10^{-5}$%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

$Cs^{128}_{55\ 73}$ 3.8^m τ **2.5^m** *1* La(480-Mev p) chem

β^+ **2.9**

d Ba^{128}

A.N.Murin, B.K.Preobrazhensky, I.A. Yutlandov, M.A.Yakimov, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 160 July (1955); Consultants Bureau Trans. p. 101.

$Cs^{129}_{55\ 74}$ 31^h $\gamma(Xe^{129})$ Cs^{133}(80-Mev p,p4n) chem

0.395 *10* scin

0.55 *3*

B.L.Robinson, R.W.Fink, Phys. Rev. 98, 221, 231A (1955).

$Cs^{131}_{55\ 76}$ 10^d Continuous γ spectrum in coincidence with K x rays has shape predicted by Morrison and Schiff for $E_\gamma > 0.05$

A.Michalowicz, Compt. rend. 242, 108 (1956).

$Cs^{134}_{55\ 79}$ 2.3^y g.s.

β^-	28%	**0.080** *3*				sl
	3%	**0.210** *10*	56%	**0.650** *5*		
	5%	**0.409** *44*	8%	**0.685** *10*		
$\gamma(Ba^{134})$	10†	**0.204** *5*				sl ce,pe
	4†	**0.475** *3*	72†	**0.796** *1*		
	14†	**0.562** *2*	11†	**0.802** *1*		
	12†	**0.569** *1*	5†	**1.035** *3*		
	100†	**0.604** *1*	3†	**1.167** *3*		
	w	**0.658** *3**	5†	**1.369** *3*		

*Due to Cs^{137} impurity?

H.H.Forster, J.S.Wiggins, Nuovo Cim. 2, 854 (1955).

$Cs^{134}_{55\ 79}$ 2.3^y g.s. Cs^{133}(slow n,γ)

$\gamma(Ba^{134})$	w	~**0.21**			scin
	<1†	**0.475** *3*	100†	**0.603** *1*	
	19†	**0.566** *4*	96†	**0.797** *2*	

K.E.Johansson, Arkiv Fysik 10, 247 (1956).

$\gamma(Ba^{134})$		α		
	(0.569)	0.0092	*12*	sl ce,Cp
	(0.605)	0.0053	*5*	
	(0.796)	0.0024	*3*	
	(1.367)	0.00049	*5*	

Z.O'Friel, A.H.Weber, Phys. Rev. 101, 1076 (1956).

(1.367γ)(0.605γ)(θ) J = 3(or 4 or 2), 2, 0

E.D.Klema, Phys. Rev. 100, 66 (1955).

No 1.451β^- ($< 5 \times 10^{-3}$%) sl

J.L.Wolfson, Can. J. Phys. 34, 256 (1956).

$Cs^{137}_{55\ 82}$ 27^y τ **$30.0^{y\ +3}_{\ -4}$** specific activity; 4π ic, ms

F.Brown, G.R.Hall, A.J.Walter, J. Inorg. Nuclear Chem. 1, 241 (1955).

$Cs^{138}_{55\ 83}$ 32^m τ **32.2^m** *1* $U^{(235)}$(n,f) chem

R.M.Bartholomew, A.P.Berg, Can. J.Chem. 34, 201 (1956).

$\gamma(Ba^{138})$			$U^{(235)}$(th n,f) chem		
2%	**0.1389**	M1*	4%	**0.87**	scin,
1%	**0.1931**		25%	**1.010**	sπ ce
2%	**0.2289**		73%	**1.426**	
3%	**0.4106**		18%	**2.21**	
26%	**0.4626**		9%	**2.63**	
8%	**0.5495**		0.5%	**3.34**	

(1.426γ)(0.139, 0.411, 0.463, 0.550, 0.87γ, 1.010γ) No (1.426γ)(2.21, 2.63γ)
(0.229γ)(2.21γ) No (0.229γ)(2.63γ)
(0.463γ)(0.139, 0.411, 0.550γ)
No (0.463γ)(1.010γ) (0.139γ)(0.87γ)
(1.010γ)(1.426γ)(θ) J = 3, 2, 0

*M1 assignment based on α

R.B.Duffield, M.E.Bunker, J.P.Mize, J.W. Starner, Phys. Rev. 100, 1236A (1955); verbal report.

Ba 56

Ba(n) E_n = 15 to 102 kev, Li(p,n)

Graph given showing 5 weak resonances

H.W.Newson, J.H.Gibbons, H.Marshak, R.M. Williamson, R.A.Mobley, A.L.Toller, R.Block, Phys. Rev. 102, 1580 (1956).

Ba^{131} 56 75 11.5^d

τ **11.52^d** *8* $Ba^{(130)}(n,\gamma)$ chem

$\gamma(Cs^{131})$				
	0.083*	360†	**0.496***	scin
200†	**0.122**	33†	**0.620**	
150†	**0.214**	2†	**0.823** *20*	
	0.244 ?	7†	**0.917** *15*	
100†	**0.372**	11†	**1.032** *15*	

(0.496 γ)(0.122 γ) Σ scin

No 0.100, 0.196, 0.585 γ's

0.823, 0.917, 1.032 γ's are not crossovers

*Two or more unresolved γ's

W.C.Beggs, B.L.Robinson, R.W.Fink, Phys. Rev. 101, 149 (1956).

$\gamma(Cs^{131})$ $Ba^{(130)}$(pile n,γ) chem

100†	**(0.496)**	scin
4†	**1.050** *15*	

R.K.Gupta, S.Jha, Proc. Phys. Soc. 69A, 70 (1956).

$Ba^{(130)}$(pile n,γ) chem

(0.495 γ)(0.122 γ) delay = $4.0^{m\mu s}$ *3*

H.Vartapétian, L.Dick, R.Foucher, N.Perrin, Compt. rend. 242, 103 (1956).

(0.495 γ)(0.122 γ) delay = $4.1^{m\mu s}$ 5

C.P.Coleman, Phil. Mag. 96, 1135 (1955).

Ba^{133} 56 77 10^y g.s.

$\gamma(Cs^{133})$ Cs^{133}(6.7-Mev d,2n) chem

6†	**0.070** 2	α_K = 2.4* 4	crit a scin
		α = 3.0$^\$$ 2	γ/0.292γ
32†	**0.081** *1*	α_K = 1.75 *5*	xγ/$\gamma\gamma$
		α = 1.95 *10*	γ/(0.292 + 0.360 γ)
26†	**0.292** *4*		scin
74†	**0.360** 2		

[1](0.292 γ)(K x ray, 0.070, 0.081 γ)

[2](0.360 γ)(K x ray, 0.081 γ)

No (0.362 γ)(0.071, 0.292 γ)

Intensity of K x rays due to α_K only

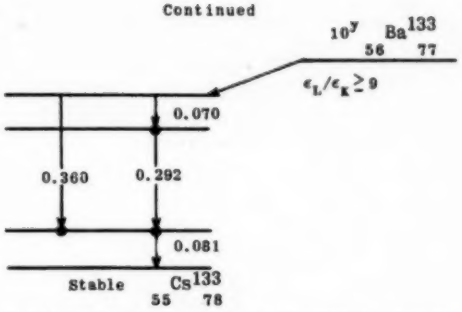
*From difference of γx oetween ([1]) and ([2])

$^\$$Assuming no ϵ to 0.373 level

Continued

Ba^{133} 56 77 10^y g.s.

Continued



M.Langevin, Ann. Phys. 1, 57 (1956); Compt. rend 238, 1310 (1954); 240, 289 (1955).

Ba^{135} 56 79

ground state enriched Ba^{135}

μ **+0.832293** *25* I

$\nu(Ba^{135})/\nu(Cl^{35})$ = 1.01387 *2*

H.E.Walchli, T.J.Rowland, Phys. Rev. 102, 1334 (1956).

Ba^{137} 56 81

ground state enriched Ba^{137}

μ **+0.931074** *55* I

$\nu(Ba^{137})/\nu(Cl^{35})$ = 1.13420 *5*

H.E.Walchli, T.J.Rowland, Phys. Rev. 102, 1334 (1956).

$Ba^{(137)}(n,n'\gamma)$ $2.6^m Ba^{137}$

Levels	
0.66	E_n = 0.5 to 3
1.05	**2.25** ?*
1.78	**2.38**

*Does not feed IT state, other levels do

C.P.Swann, F.R.Metzger, Phys. Rev. 100, 1329 (1955).

Ba^{139} 56 83

Levels $Ba^{(138)}(d,p)$ E_d = 7.0, 7.5

1†	g.s.	Q = 2.493 *10*	s 90°
1.5†	**0.623** *8*		

†Relative intensity for E_d = 7.0

C.H.Paris, W.W.Buechner, P.M.Endt, Phys. Rev. 100, 1317 (1955).

Ba^{140} 56 84 13^d

$\gamma(La^{140})$

(0.030)	**0.304**	scin
~**0.132**	**0.436**	
0.162	**0.537**	

(0.030 γ)(0.436 γ) (0.304 $\gamma\gamma$)(0.162 γ) Σ scin

(~0.132 $\gamma\gamma$)(0.304 $\gamma\gamma$) No γ(0.537 γ)

(0.304 $\gamma\gamma$)(0.162 $\gamma\gamma$)(θ) consistent with J = 1,3,4

$W(\theta) = 1 + (0.0937\ 8)P_2(\cos\theta) - (0.056\ 10)\ P_4(\cos\theta)$

W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 102, 1130 (1956).

$_{57}La$ Relative isotopic abundances ms

La^{138} **0.089%** *1.5*

La^{139} **99.911%** *1.5*

No La^{134}, La^{135}, La^{136} ($<7\times10^{-6}$%)

No La^{137} ($<14\times10^{-6}$%) No La^{140} (<0.001%)

No La^{141} (<0.002%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

$_{57}La^{137}_{80}$ $\sim6\times10^{4y}$

$Ce^{(136)}(n,\gamma\epsilon)$ chem

τ_{ϵ_K} 6×10^{4y} *2* specific activity

x **Ba K x ray** pc,crit a

$E_{dis} \gg 0.040$

from $[(x_L/x_K)La^{137}]/[(x_L/x_K)Ce^{139}]\sim0.5$

A.R.Brosi, B.H.Ketelle, Phys. Rev. 103, 917 (1956).

τ $>10^{5y}$ d 8.7^hCe

From absence of Ba K,L x rays crit a,pc

A.R.Brosi, B.H.Ketelle, Phys. Rev. 100, 169 (1955).

$_{57}La^{138}_{81}$ 2×10^{11y}

τ_{ϵ_K} 3.2×10^{11y} *7* natural La chem; pc

0.23 K x rays/sec g La

$\epsilon_L/\epsilon_K \leq 0.5$ (L x rays not observed)

H.Selig, Thesis, Carnegie Inst. Tech. (1954); NYO-6626 (1954).

natural La

$\gamma(Ce^{138})$ **0.81** *1* 0.36**3* γ's/sec g scin

$\gamma(Ba^{138})$ **1.43** *1* 0.41 *3* γ's/sec g

x **K x ray** 0.145 *10* K x rays/sec g

(K x ray)(1.43γ) No 0.535γ

No (K x ray)(0.81γ)

$E_{dis} = 0.160$ *30* from $\epsilon_L/\epsilon_K = 1.4$ *3*, used $\omega_K = 0.85$

*Assumed 3.4 *1* γ's/sec g K

W.Turchinetz, R.W.Pringle, Phys. Rev. 103, 1000 (1956).

$_{57}La^{139}_{82}$

ground state

q $+0.3$ *1* S

G.Lührs, Z. Phys. 191, 486 (1955).

ground state

q $+0.6$ *2* S

K.Murakawa, J. Phys. Soc. Japan 10, 927 (1955); Phys. Rev. 98, 1285 (1955).

$La^{(139)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

No γ with $E_\gamma < 0.6$; 0.166 level not E2 excited

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

$_{57}La^{140}_{83}$ $_{40}h$

$\gamma(Ce^{140})$

159†	(0.329)	114†	(0.926)	s π Cp
370†	(0.486)	1000†	(1.597)	
350†	(0.816)	59†	2.535	

B.S.Dzelepov, J.V.Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956).

(0.328 γ)(1.60 γ)(θ) scin

(0.328 γ)(0.49 γ)(θ)

(0.815 γ)(1.60 γ)(θ)

(0.490 γ)(1.60 γ)(θ)

Consistent with J = 3, 4, 2, 0 for Ce^{140} levels at 2.42, 2.09, 1.60, g.s.

W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 102, 1130 (1956).

$_{58}Ce$ $Ce(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

No γ with $E_\gamma < 0.6$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Resonance Ce(n) $E_n = 5$ to 60 kev,

peak **24** kev $l_n = 0$ Li(p,n)

Assigned to Ce^{141}

Graph given showing 11 more peaks

H.W.Newson, J.H.Gibbons, H.Marshak, R.M. Williamson, R.A.Mobley, A.L.Toller, R.Block, Phys. Rev. 102, 1580 (1956); 94, 774A (1954).

$_{58}Ce^{134}_{76}$ $_{72}h$

τ **66**^{h} U(480-Mev p) chem

A.P.Vinogradov, I.P.Alimarin, V.I. Baranov, A.K.Lavrukhina, T.V.Baranova, F.I.Pavlotskaya, A.A.Bragina, Y.V. Yakovlev, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 97 July (1955); Consultants Bureau Trans. p. 65.

$_{58}Ce^{137}_{79}$ 8.7^h g.s.

τ 8.7^h Ce^{136}(slow n,γ) chem

ϵ 100% **La K x ray** crit a,pc

$\gamma(La^{137})$ **0.010** $\alpha\sim140$ sl ce,pc x/γ

3%* **0.445** $\alpha_K\sim0.02$ scin

(0.445 γ)(0.010γ) delay $<0.1^{\mu s}$ scin,pc

(La K x ray)(0.010, 0.445γ) crit a,pc

d 35^hCe

*From 0.445γ/(0.255γ of 35^hCe^{137})

A.R.Brosi, B.H.Ketelle, Phys. Rev. 103, 917 (1956); 100, 169 (1955).

τ 9^h d 1.5^hPr

ϵ 100%

$\gamma(La^{137})$

2.3% **0.440** No 0.254γ

G.T.Danby, A.L.Thompson, J.S.Foster, Proc. Roy. Soc. Canada 50, 27A (1956).

$Ce^{137}_{58\ 79}$ 35^h

Ba(48-Mev α) chem; Ce^{136}(pile n,γ)

τ **34.5^h** 5

γ **0.255** $\alpha_K = 5.5 \pm 1.5$ sl ce,scin
K/L = 2.3 ± 0.2 M4 sl ce

x **Ce K x ray** crit a,pc

p 8.7^h Ce^{137}

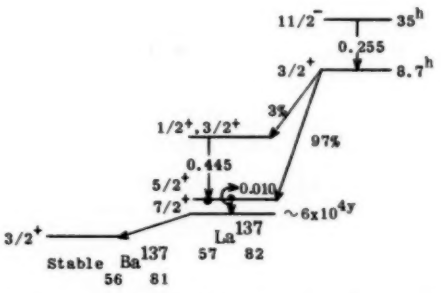
A.R.Brosi, B.H.Ketelle, Phys. Rev. 100, 169 (1955).

τ **34.1^h** La^{139}(p,3n)

γ(Ce^{137}) **0.2545**

0.1% branching to a level ~0.800 in La^{137}

G.T.Danby, A.L.Thompson, J.S.Foster, Proc. Roy. Soc. Canada 50, 27A (1956).



A.R.Brosi, B.H.Ketelle, Phys. Rev. 103, 917 (1956).

$Ce^{139}_{58\ 81}$ 140^d g.s.

γ(La^{139}) La(139)(22-Mev p,n), Ba(45-Mev α) chem

100% **(0.166)** $\alpha_K = 0.22$ *1* 4π scin,sl
K:L:M 26.6:3.7:1 x/γ,xγ/x,
$\epsilon/\epsilon_K = 1.37$ *2* ω_K(La) = 0.88 *1* xx/x,
No ε to g.s. of La^{139} e_{AK}/ce_K
$E_{dis} = 0.270$ $e_{AK}/ce_K = 0.62$ *4*

B.H.Ketelle, H.Thomas, A.R.Brosi, Phys. Rev. 103, 190 (1956).

γ(La^{139}) **(0.166)** · E2/M1 ~0.04 γ(θ,T)
γ(θ,T) consistent with J = 3/2 ≤ 5/2 ≤ 7/2

E.Ambler, R.P.Hudson, G.M.Temmer, Phys. Rev. 101, 196 (1956).

$Ce^{139}_{58\ 81}$ 55^s

τ **55^s** *3* Ce^{138}(pile n,γ)

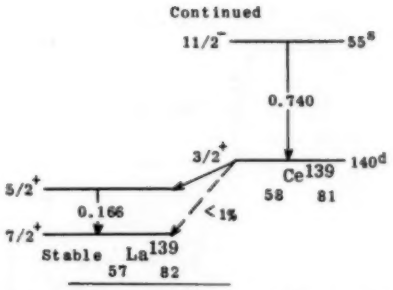
γ(Ce^{139}) **0.740** 5 $\alpha_K = 0.08$ *2* scin

x **Ce K x ray** pc

Continued

$Ce^{139}_{58\ 79}$

Continued



B.H.Ketelle, H.Thomas, A.R.Brosi, Phys. Rev. 103, 190 (1956).

$Ce^{141}_{58\ 83}$ 33^d

γ(Pr^{141}) **0.1416** *3* Ce^{140}(pile n,γ) sd ce

D.W.Martin, M.K.Brice, J.M.Cork, S.B.Burson, Phys. Rev. 101, 182 (1956).

γ(Pr^{141}) $Ce^{(140)}$(pile n,γ)

(0.145) E2/M1 = 0.007 *3*

γ(θ,T) and γ(L,,T) studied for aligned Ce

C.F.M.Cacho, M.A.Grace, C.E.Johnson, A.C. Knipper, R.G.Scurlock, R.T.Taylor, Phil. Mag. 46, 1287 (1955).

$Ce^{143}_{58\ 85}$ 33^h

τ **33.4^h** Ce^{142}(n,γ)

β⁻	6%	~0.22	sd; scin β(1.10 γ)
	12%	**0.50** *3*	sd; scin β(0.86 γ)
	5%	**0.74** *15*	sd; scin β(0.67 γ)
	40%	**1.125** *15*	sd; scin β(0.29 γ)
	37%	**1.40** *2*	sd; scin β(0.06 γ)

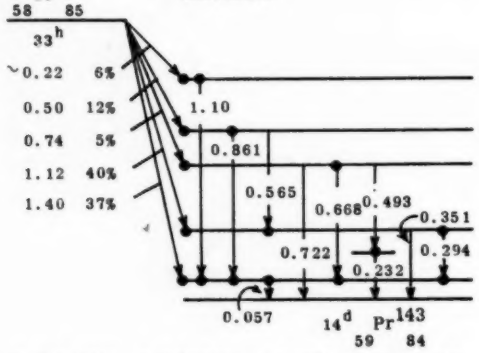
γ(Pr^{143})	**0.0574** *2*	$\alpha_K = 5.9$	M1*	sπ ce,
	0.232 *1*			scin
	0.294 *1*		**0.668** *2*	
	0.351 *1*		**0.722** *2*	
	0.493 *2*		**0.861** *5*	
	0.565 *5***		**1.10** *1*$	

(0.057 γ)(0.294, 0.668, 0.861, 1.10 γ)
(0.232 γ)(0.493 γ) (0.294 γ)(0.565 γ)
No other γγ coincidences observed
No 1.46 β (<2%) scin β,βγ
No 0.126, 0.160 γ
*L_2 ce not observed
**Observed only in (0.294 γ) γ spectrum scin
$ce not observed

Continued

Ce^{143} 58 85 33^h

Ce^{143} 58 85 33^h Continued

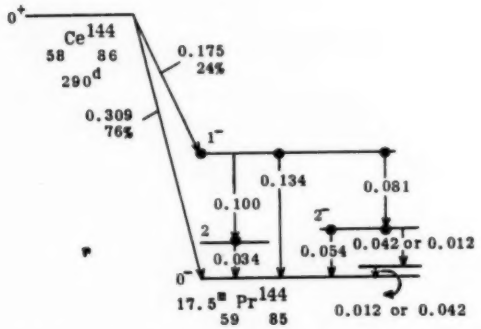


D.W.Martin, M.K.Brice, J.M.Cork, S.B.Burson, Phys. Rev. 101, 182 (1956).

Ce^{144} 58 86 290^d

β^-	24%	0.175 5				U(n,f) chem sl
	76%	0.309 5				
$\gamma(Pr^{144})$		0.012 ?				sl ce,pe;scin
	<7*	0.0338 3				
	7*	0.042				
	~0.2*	0.0539 3	α_K	K/L_1	L_1/M	
	17*	0.0810 3	1.2 3	5.8 7	~10	
	<2*	0.1003 3				
	29*	0.1344 3	0.71 25	7.1 5	~4	

No β with $0.175 < E_\beta < 0.309$ (<5%)
<0.10 β group is possible
No γ with $0.050 < E_\gamma < 0.065$ (<3*)
No 0.054 photons (<1% of x rays) pc
No 0.145γ sl ce
$0.134\gamma/0.081\gamma = 2.60\ 5$ $0.134\gamma/0.100\gamma = 7.5\ 5$
(0.175β)(x ray, 0.081, 0.134γ) scin
No ($E_\beta > 0.180$)(x ray, 0.081, 0.134γ)
(0.081γ)(x ray) (0.054γ)(x ray, 0.081γ)
(0.034γ)(0.100γ) (x ray)(x ray)
No (0.134γ)(γ, x ray)
*ce per 100 0.175β's



I.Pullman, P.Axel, Phys. Rev. 102, 1366 (1956).

Pr^{137} 59 78 1.5^h

τ	1.5^{h*}		$Ce^{(140)}(p,4n)$
β^+	1.8		
$\beta^+/\epsilon = 0.20$	No γ		

G.T.Danby, A.L.Thompson, J.S.Foster, Proc. Roy. Soc. Canada 50, 27A (1956); *Dahlstrom, ibid.

Pr^{141} 59 82

ground state

J	5/2	para
$\|\mu\|$	3.9 2	

J.M.Baker, B.Bleaney, Proc. Phys. Soc. 68A, 936 (1955).

ground state

μ	+4.0 1	S
q	0.0 2	

K.Murakawa, J.Phys. Soc. Japan 9, 93 (1954).

$Pr^{141}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
No γ with $E_\gamma < 0.6$; 0.145 level not E2 excited

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Pr^{143} 59 84 14^d

τ	13.95^d	$Ce^{142}(n,\gamma\beta)$
β^-	0.93 1	sd

D.W.Martin, M.K.Brice, J.M.Cork, S.B.Burson, Phys. Rev. 101, 182 (1956).

Nd 60 Relative isotopic abundances ms

Nd^{142}	27.3% 2		
Nd^{143}	12.32% 9	Nd^{146}	17.10% 14
Nd^{144}	23.8% 1.8	Nd^{148}	5.67% 5
Nd^{145}	8.29% 6	Nd^{150}	5.56% 5

No Nd^{139} ($<3 \times 10^{-4}$%)
No Nd^{147}, Nd^{152} ($<2 \times 10^{-4}$%)
No Nd^{140}, Nd^{149}, Nd^{151}, Nd^{153} ($<1 \times 10^{-4}$%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

Nd(n,n'γ) $E_n = 4.4$

γ	0.46 1	in Nd^{146} scin
	1.60 2	in Nd^{142}

Known level data suggest mass assignments

R.M.Sinclair, Westinghouse Research Report 60-94511-6-R12 (1956).

Nd^{143} 60 83

$Nd^{143}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
No γ with $E_\gamma < 0.6$

N. P. Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Nd^{144} 60 84 5×10^{15}y

τ	5×10^{15}y 2.5	enriched Nd^{144}	ppl
α	1.8 1		ppl

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956); 9a, 701 (1954).

$_{60}Nd^{145}_{85}$

γ $Nd^{145}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
0.070 *1* $\epsilon B(E2) \sim 0.03$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$_{60}Nd^{146}_{86}$

Level $Nd^{146}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
γ **0.455** *5* $\epsilon B(E2) = 0.84$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$_{60}Nd^{147}_{87}$ 12^d

ground state
J **9/2** $\gamma(\theta,T)$
$|\mu|$ **0.22** *5*

$\gamma(Pm^{147})$ **(0.092)** E2/M1 ~ 0.03 $\gamma(\theta,T)$
(0.530) E2 = 100%
$\gamma(\theta,T)$ shows $J = 9/2\text{-}\beta\rightarrow 9/2 - (0.530\,\gamma) \rightarrow 5/2$

E.Ambler, R.P.Hudson, G.M.Temmer, Phys. Rev. 101, 196 (1956); 97, 1212; 98, 230A (1955).

$_{60}Nd^{148}_{88}$

Level $Nd^{148}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
γ **0.300** *3* $\epsilon B(E2) = 1.50$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$_{60}Nd^{150}_{90}$

Natural Nd
$\tau_{\beta\beta}$ $> 2.2 \times 10^{18}$y scin $\beta\beta$

C.L.Cowan, F.B.Harrison, L.M.Langer, F. Reines, Nuovo Cim. 3, 649 (1956).

Level $Nd^{(150)}(p,p'\gamma)$ $E_p = 1.75$
γ **0.132** *1* $\epsilon B(E2) \sim 0.3$ sd ce$_L$

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Level $Nd^{150}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$
γ **0.128** *1* $\epsilon B(E2) = 1.32$ scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); priv. comm.

$_{61}Pm^{147}_{86}$ 2.6^y

U(n,f) chem
$\gamma(Sm^{147})$ **0.121** scin

H.Langevin-Joliot, J. phys. radium 17, 497 (1956).

$_{62}Sm^{143}_{81}$ 9^m

$Sm^{(144)}(\leq 22\text{-Mev } \gamma,n)$
τ **9.03**^{m}
β^+ **2.6** a
(γ,n) threshold = 9.6

E.Silva, J.Goldemberg, Nuovo Cim. 3, 12 (1956).

$_{62}Sm^{143}_{81}$ 9^m

τ **8.3**^{m} *3* $Sm^{(144)}(\leq 30\text{-Mev n,2n})$
β^+ **2.3** *3* a
No γ with $E_\gamma > 0.15$ scin

M.Mirnik, A.H.W.Aten,Jr., Physica 22, 14 (1956).

$_{62}Sm^{147}_{85}$

ground state
$|\mu|$ **0.83** *15* para
$|q|$ < 0.72
Calculated from data of G.S.Bogle, H.E.D. Scovil, Proc. Phys. Soc. 65A, 368 (1952).

R.J.Elliott, K.W.H.Stevens, Proc. Roy. Soc. 219, 387 (1953).

$Sm^{147}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
No γ with $E_\gamma < 0.6$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$_{62}Sm^{148}_{86}$

Level $Sm^{148}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
γ **0.562** *6* $\epsilon B(E2) = 2.06$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level $Sm^{148}(p,p'\gamma)$ $E_p = 2.9$; scin
γ **0.55** *5* $\epsilon B(E2) = 0.74$

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Level $Sm^{148}(p,p'\gamma)$ $E_p = 3.29$; scin
γ **0.562** *8*

B.E.Simmons, K.F.Famularo, G.D.Freier, Phys. Rev. 100, 1265A (1955).

$_{62}Sm^{149}_{87}$

ground state
$|\mu|$ **0.68** *10* para
$|q|$ < 0.72
Calculated from data of G.S.Bogle, H.E.D. Scovil, Proc. Phys. Soc. 65A, 368 (1952)

R.J.Elliott, K.W.H.Stevens, Proc. Roy. Soc. 219, 387 (1953).

$Sm^{149}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
No γ with $E_\gamma < 0.6$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$_{62}Sm^{150}_{88}$

Level $Sm^{150}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin
γ **0.337** *3* $\epsilon B(E2) = 2.32$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level $Sm^{150}(p,p'\gamma)$ $E_p = 2.9$; scin
γ **0.335** *17* $\epsilon B(E2) = 0.51$

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

$_{62}Sm^{150}_{88}$

Level	$Sm^{150}(p,p'\gamma)$	$E_p = 2.61$; scin	
γ	**0.337** *3*	$p,\gamma(\theta)$ studied	

B.E. Simmons, K.F. Famularo, G.D. Freier, Phys. Rev. 100, 1265A (1955).

Capture γ's	$Sm^{(149)}$(th n,γ)		$s\pi$ Cp
38†	**0.33** *1*		~4.15 *10*
33†	**0.44** *1*		~4.25 *10*
12†	**0.60** *1*		~4.40 *10*
7†	**0.67** *2*		~4.50 *10*
19†	**0.76** *1*	>0.15†	**4.65** *10*
	0.90 *3*		**4.8** *1*
	0.95 *3*		**5.0** *1*
3†	**1.07** *2*	>0.5†	**5.60** *5*
7†	**1.20** *2*		~5.9 *1*
>2†	**1.27** *3*	>0.3†	**6.00** *5*
>5†	**1.35** *2*	~0.35†	**6.54** *10*
	~**1.50** *5*	~0.06†	**6.80** *5*
	~**1.60** *5*	0.7†	**7.22** *3*

Level scheme implies $B_n = 8.00$ *3*
Levels proposed at 0.33, 0.77, 1.20, 1.43, 1.54, 2.00, 2.30, 3.35
Lines between 1.60 and 4.15 not resolved
†Photons/100 Sm captures

B.P. Adyasevich, B.D. Groshev, A.M. Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

$_{62}Sm^{152}_{90}$

Level	$Sm^{152}(p,p'\gamma)$	$E_p = 2.28$; scin	
γ	**0.124** *2*	$p,\gamma(\theta)$ studied	

B.E. Simmons, K.F. Famularo, G.D. Freier, Phys. Rev. 100, 1265A (1955).

Level	$Sm^{152}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$; scin	
γ	**0.122** *1*	$\epsilon B(E2) = 1.36$	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level	$Sm^{152}(p,p'\gamma)$	$E_p = 2.9$; scin	
γ	**0.125** *6*	$\epsilon B(E2) = 0.43$	

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Level	$Sm^{(152)}(p,p'\gamma)$	$E_p = 1.75$	
γ	**0.123** *1*	$\epsilon B(E2) = 0.56$	sd ce_L

T. Huus, J.H. Bjerregaard, B. Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Level	$Sm^{152}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$	
γ	**0.122** *1*	$\epsilon B(E2) = 1.52$	scin

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); priv. comm.

$_{62}Sm^{153}_{91}$ $_{47}{}^{h}$

β^-	0.06%	**0.130**	32%	**0.720**	scin
	41%	**0.645**	27%	**0.825**	
$\gamma(Eu^{153})$					
	680*	**0.070**			scin
	1000*	**0.100**	0.65*	**0.530**	
	0.45*	**0.170**	0.15*	**0.600**	

(0.53 γ)(0.07, 0.10 γ) (0.10 γ)(0.07, 0.60 γ)
No (0.60 γ)(0.07 γ)
*Estimated relative transition probabilities

V.S. Dubey, C.E. Mandeville, N.A. Rothman, Bull. Am. Phys. Soc. 1, No. 4, 164 B12 (1956); verbal report.

$\gamma(Eu^{153})$	1†	**0.07**		scin
	10†	**0.10327** *2*		cryst

B. Andersson, Proc. Phys. Soc. 69A, 415 (1956).

$_{62}Sm^{154}_{92}$

Level	$Sm^{154}(p,p'\gamma)$	$E_p = 2.07$; scin	
γ	**0.085** *3*	$p,\gamma(\theta)$ studied	

B.E. Simmons, K.F. Famularo, G.D. Freier, Phys. Rev. 100, 1265A (1955).

Level	$Sm^{154}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$; scin	
γ	**0.082** *1*	$\epsilon B(E2) = 0.48$	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level	$Sm^{154}(p,p'\gamma)$	$E_p = 2.9$; scin	
γ	**0.084** *4*	$\epsilon B(E2) = 0.27$	

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Level	$Sm^{(154)}(p,p'\gamma)$	$E_p = 1.75$	
γ	**0.083** *1*	$\epsilon B(E2) = 2.9$	sd ce_L

T. Huus, J.H. Bjerregaard, B. Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Level	$Sm^{154}(\alpha,\alpha'\gamma)$		$E_\alpha = 6$
γ	**0.082** *1*	$\epsilon B(E2) = 0.80$	scin

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); priv. comm.

$_{63}Eu^{151}_{88}$

Levels	$Eu^{151}(\alpha,\alpha'\gamma)$		$E_\alpha = 6.5$
	0.195 level		scin
γ	**0.195**	$\epsilon B(E2) = 0.067$	
	0.304 level		
γ	**0.110**	$\epsilon B(E2) = 0.024$	
	0.195		
	0.304	$\epsilon B(E2) = 0.22$	

N.P. Heydenburg, G.M. Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

$_{63}Eu^{151}_{88}$ γ $Eu^{(151)}(p,p'\gamma)$ $E_p = 2.9$; scin

0.300 *15*

H. Mark, G. T. Paulissen, Phys. Rev. 100, 813 (1955).

$_{63}Eu^{152}_{89}$ τ **12.7^y** *2* Eu(pile n)

13^y g.s.

E. E. Lockett, R. H. Thomas, Nucleonics 14, No. 11, 127 (1956); 11, No. 3, 14 (1953).

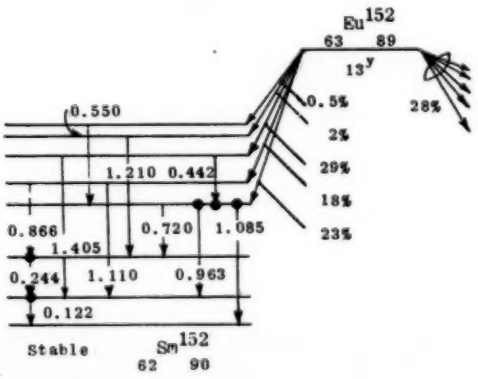
β^-	2%	**1.000**		sl
	13%	**1.460**		
$\gamma(Sm^{152})$				
	59%	**0.122**		sl ce, scin
	9%	**0.244**	14%	**0.963**
	5%	**0.442**	13%	**1.085**
	0.5%	**0.550**	12%	**1.110**
	1%	**0.720**	2%	**1.210**
	6%	**0.866**	25%	**1.405**
$\gamma(Gd^{152})$				
	27%	**0.344**	9%	**0.778**
	2.5%	**0.408**	1.5%	**1.100**
	0.3%	**0.690**	2%	1.240

(0.122 γ)(0.963, 1.110, 1.405 γ)
(0.244 γ)(0.866, 1.210 γ)
(0.442 γ)(0.963, 1.085 γ)
(0.344 γ)(0.778, 1.100, 1.240 γ)
(0.408 γ)(0.344, 0.690 γ)
(1.00 β)(0.408 γ) (1.46 β)(0.344 γ) scin

L. Grodzins, H. Kendall, Bull. Am. Phys. Soc. 1, No. 4, 163 B10, 164 B11 (1956); verbal report.

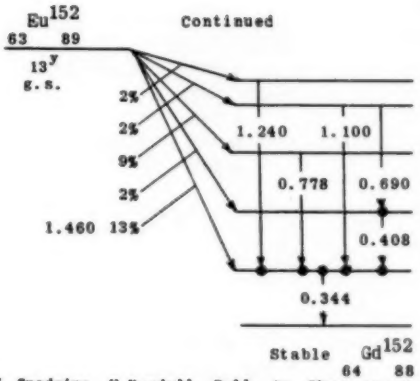
$\gamma(Sm^{152})$	**0.12231** *4*	cryst
	0.24464 *8*	
$\gamma(Gd^{152})$	**0.34434** *23*	

B. Andersson, Proc. Phys. Soc. 69A, 415 (1956).



Continued

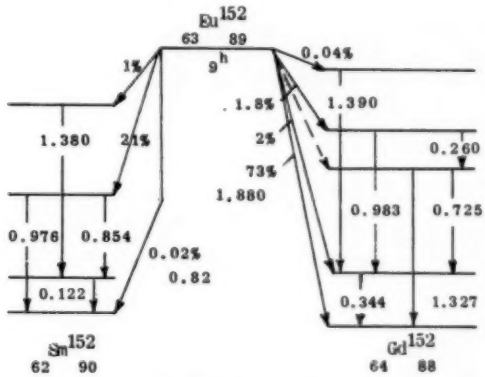
$_{63}Eu^{152}_{89}$ 13^y g.s. Eu152 63 89 Continued



L. Grodzins, H. Kendall, Bull. Am. Phys. Soc. 1, No. 4, 163 B10, 164 B11 (1956); verbal report.

$_{63}Eu^{152}_{89}$ 9.2^h

β^+		**0.82** *10*		scin
β^-		**1.880**		sl
$\gamma(Sm^{152})$				sl ce, scin
	15.2%	**0.122**	6.7%	**0.976**
	14.2%	**0.854**	1.0%	**1.380**
$\gamma(Gd^{152})$				
	0.1%	**0.260**	0.5%	**0.983**
	2.7%	**0.344**	1.2%	**1.327**
	0.1%	**0.725**	0.04%	**1.390**



L. Grodzins, H. Kendall, Bull. Am. Phys. Soc. 1, No. 4, 163 B10, 164 B11 (1956); verbal report.

$_{63}Eu^{153}_{90}$ Levels $Eu^{(153)}(p,p'\gamma)$ $E_p = 2.9$; scin

0.085 level

γ **0.085** *4* $\epsilon B(E2) = 0.20$

0.200 level

γ **0.085** *4*
0.115 *6*
0.200 *10* $\epsilon B(E2) = 0.14$

H. Mark, G. T. Paulissen, Phys. Rev. 100, 813 (1955).

Levels $Eu^{(153)}(p,p'\gamma)$ $E_p = 1.75$

0.084 level

γ **0.084** *1* $\epsilon B(E2) = 0.65$ sd ce_L

0.195 level

γ **0.084** *1*
$\sim$**0.111** *1* $\epsilon B(E2) < 0.05$ ce_L
0.195 *2* $\epsilon B(E2) \sim 0.05$ ce_K

T. Huus, J. H. Bjerregaard, B. Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Eu^{153} 63 90

Levels $Eu^{153}(\alpha,\alpha'\gamma)$ $E_\alpha = 6.5$ scin

0.082 level

γ **0.082** $\epsilon B(E2) = 0.60$

0.187 level

γ **0.082**

0.105 $\epsilon B(E2) = 0.18$

0.187 $= 0.29$

N.P.Heydenburg, G.M.Temmer, Bull. Am. Phys. Soc. 1, No. 4, 164 C3 (1956); verbal report.

Levels $Eu^{(153)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

0.082 level

γ **0.082** *1* $\epsilon B(E2) = 0.36$

0.187 level

γ **0.082** *1*

0.3† **0.105** *1*

1† **0.187** *2* $\epsilon B(E2) = 0.49$

$(0.082\gamma)(0.105\gamma)$

Assignment to Eu^{151} also possible

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955); Bull. Am. Phys. Soc. 1, No. 1, 43 K11 (1956); verbal report..

Eu^{154} 63 91 16^y

$\gamma(Gd^{154})$ **0.12354** *9* cryst

B.Andersson, Proc. Phys. Soc. 69A, 415 (1956).

$\gamma(Gd^{154})$ $Eu^{(153)}(\text{pile n},\gamma)$; scin

$(1.42\gamma)(0.123\gamma)(\theta)$ consistent with J = 6, 2, 0

B.Hartmann, T.Wiedling, Arkiv Fysik 10, 355 (1956).

Eu^{155} 63 92 1.7^y

β^- 79% **0.150** *10* scin

21% **0.240** *10*

$\gamma(Gd^{155})$ **0.018** scin

0.084

0.102

No $(0.24\beta)\gamma$

V.S.Dubey, C.E.Mandeville, M.A.Rothman, Bull. Am. Phys. Soc. 1, No. 4, 164 B12 (1956); verbal report.

Gd 64

No α's $\tau > 4\times10^{16y}$ for $1.5 < E_\alpha < 2.5$; ppl

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956).

Gd^{153} 64 89 236^d

$\gamma(Eu^{153})$ $Gd^{(152)}(\text{pile n},\gamma)$

5† **0.069** K/L > 4.5 scin,s ce

~28† **0.098** *5* $\alpha_K = 0.3^*$ *1* E1

~27† **0.103** K/L = 6

x 100† **K x ray**

Continued

Gd^{153} 64 89 236^d

Continued

$(ce_K\ 0.098\gamma)/(ce_K\ 0.103\gamma) = 0.25$ *5*

No $(0.098\gamma)(0.103\gamma)$ No β^+

Authors conclude $\epsilon_L/\epsilon_K > 1$, $E_{dis} \sim 0.22$

*Assuming $\alpha_K = 1.2$ for 0.103γ

N.Marty, M.Vergnes, Compt. rend. 242, 1438 (1956).

$\gamma(Eu^{153})$ source not described

7† **0.072** *8* scin

100† **0.100** *4* $\alpha_K = 0.67$ *12* $x\gamma/\gamma$, xx/x,

x 160† **K x ray** x/γ

(K x ray)(K x ray, 0.072?, 0.100γ)

No other γ

Authors conclude $\epsilon_L/\epsilon_K \sim 0.42$, $E_{dis} \sim 0.20$

$E_{dis} = 0.225^*$ Σ scin

S.K.Bhattacherjee, S.Raman, Nuclear Phys. 1, 486 (1956); *R.K.Gupta, S.Jha, ibid.

$Gd^{(152)}(\text{pile n},\gamma)$

$\gamma(Eu^{153})$ **0.104** $\alpha_K = 0.68^*$ *2* scin xx/xγ

x **K x ray** scin

L x ray pc

$\epsilon_L/\epsilon_K = 0.68^*$ *2* Σ scin, scin xγ/γ

$\omega_L(Eu) = 0.17$ pc, scin xγ/γ

K x ray/0.104γ = 1.65 *2* scin

Authors conclude $E_{dis} = 0.083$ *2* + 0.104 (E_γ)

No ε to g.s. of Eu^{153} (< 3%)*

*Used $\omega_K = 0.91$ and K/L = 5.3 for 0.104γ

A.Bisi, E.Germagnoli, L.Zappa, Nuclear Phys. 1, 593 (1956).

$\gamma(Eu^{153})$ **(0.103)** $\alpha = 1.2$ Σ scin

No ε to g.s. (<10%) Σ scin

S.G.Cohen, Y.Burde, S.Ofer, Bull. Research Council Israel 5A, 87A (1955).

Gd^{154} 64 90

Level $Gd^{154}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ **0.123** *1* $\epsilon B(E2) = 2.10$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); verbal report.

Level $Gd^{154}(p,p'\gamma)$ $E_p = 1.9$; scin

γ **0.123*** *6* $\epsilon B(E2) = 1.0$

*Composite γ

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Gd^{155} 64 91

ground state enriched Gd^{155}; S

J **3/2***

μ **-0.30** *4*

q **+1.1** *3*

Continued

Gd^{155} 64 91 — Continued

$\mu(Gd^{155})/\mu(Gd^{157}) = 0.80\ 2$

*Value consistent with theory for deformed nuclei[$], not with shell model prediction

D.R.Speck, Phys. Rev. 101, 1725 (1956); 100, 973A (1955); $B.R.Mottleson, S.G.Nilsson, Phys. Rev. 99, 1615 (1955).

Levels	$Gd^{155}(\alpha,\alpha'\gamma)$	$E_\alpha = 1.75$
	$Gd^{155}(p,p'\gamma)$	$E_p = 1.75$
γ	**0.060** *1* $\epsilon B(E2) = 0.48$	sd ce_L
	0.146 2 $\epsilon B(E2) = 0.06$	sd ce_K

J.H.Bjerregaard, U.Meyer-Berkhout, Z. Naturf. 11a, 273 (1956).

Level	$Gd^{155}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$
γ	**0.145** *1* $\epsilon B(E2) = 0.105$	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); priv. comm.

Level	$Gd^{155}(p,p'\gamma)$	$E_p = 2.9$
γ	**0.140** *14*	scin

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Gd^{156} 64 92

Level	$Gd^{156}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$; scin
γ	**0.089** *1* $\epsilon B(E2) = 1.24$	

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level	$Gd^{156}(p,p'\gamma)$	$E_p = 1.9$; scin
γ	**0.089** *5* $\epsilon B(E2) = 0.74$	

H. Mark, G.T. Paulissen, Phys. Rev. 100, 813 (1955).

Resonance	$Gd^{(155)}(n)$
	2.01 ev $\Gamma_\gamma = 104$ *5* mev

E.T.Florance, V.L.Sailor, quoted by H.H. Landon, Phys. Rev. 100, 1414 (1955).

Gd^{157} 64 93

	ground state	enriched Gd^{155}; S
J	3/2*	
μ	−0.37 4	
q	+1.0 *3*	

*Value consistent with theory for deformed nuclei[$], not with shell model prediction

D.R.Speck, Phys. Rev. 101, 1725 (1956); 100, 973A (1955); $B.R.Mottleson, S.G.Nilsson Phys. Rev. 99, 1615 (1955).

Levels	$Gd^{157}(\alpha,\alpha'\gamma)$	$E_\alpha = 1.75$
	$Gd^{157}(p,p'\gamma)$	$E_p = 1.75$
γ	**0.055** *1* $\epsilon B(E2) = 0.54$	sd ce_L
	0.132 2 $\epsilon B(E2) = 0.03$	

J.H.Bjerregaard, U.Meyer-Berkhout, Z. Naturf. 11a, 273 (1956).

Level	$Gd^{157}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$
γ	**0.131** *1* $\epsilon B(E2) = 0.086$	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); priv. comm.

Level	$Gd^{157}(p,p'\gamma)$	$E_p = 2.9$
γ	**0.127** *13*	scin

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Gd^{158} 64 94

Level	$Gd^{158}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$; scin
γ	**0.079** *1* $\epsilon B(E2) = 1.02$	

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955); verbal report.

Level	$Gd^{158}(p,p'\gamma)$	$E_p = 1.9$; scin
γ	**0.080** *4* $\epsilon B(E2) = 0.63$	

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Resonance	$Gd^{(157)}(n)$
	2.82 ev $\Gamma_\gamma = 114$ *5* mev

E.T.Florance, V.L.Sailor, quoted by H.H. Landon, Phys. Rev. 100, 1414 (1955).

Gd^{159} 64 95 18^h

$\gamma(Tb^{159})$	**(0.058)**	
	0.080	scin
2.5†	**0.225** *10*	sl ce, scin
0.5†	~**0.300**	scin
100†	**0.362** 2 K/L ~2	sl ce, scin

$(\sim 0.95\beta)(0.058\gamma)$ $(0.225\gamma)(0.058,\ 0.080\gamma)$

$\alpha_K(0.225\gamma)/\alpha_K(0.362\gamma) = 15$ *10*

R.Ballini, R.Barloutaud, J. phys. radium 17, 534 (1956).

Gd^{160} 64 96

Level	$Gd^{160}(\alpha,\alpha'\gamma)$	$E_\alpha = 6$; scin
γ	**0.076** *1* $\epsilon B(E2) \sim 1$	

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Level	$Gd^{160}(p,p'\gamma)$	$E_p = 1.9$; scin
γ	**0.076** *4* $\epsilon B(E2) = 0.73$	

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Tb^{158}_{65}? τ **11^s** $Tb^{159}(\gamma)$
x **Tb K x ray** scin

M.G.Stewart, A.J.Bureau, C.L.Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

Tb^{159}_{65} Level $Tb^{159}(\alpha,\alpha'\gamma)$ E_α = 6; scin

0.136 level

γ **0.079** *1* $\epsilon B(E2)$ = 0.19
0.136 *1* = 0.041

Yields show that both γ's are from 0.136 level

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

γ $Tb^{159}(p,p'\gamma)$ E_p = 2.9; scin
0.077 4

Also observed 0.17 γ; Er or Dy impurity?

H.Mark, G.T.Paulissen, Phys. Rev. 100, 813 (1955).

Level $Tb^{159}(\alpha,\alpha'\gamma)$ E_α = 6

0.136 level

γ 100† **0.079** scin
30† **0.136**

G.M.Temmer, N.P.Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

Tb^{160}_{65} $^{73}_{95}$ ^{d} β^- 14% **0.367** *12* 35% **0.861** 2 sl
51% **0.564** *7* 0.3% **1.711** *7*
γ's and $\beta\gamma$'s are reported scin,sl pe,sl ce

G.Bertolini, M.Bettoni, E.Lazzarini, Nuovo Cim. 3, 754 (1956).

$(0.30\gamma)(E_\gamma > 0.75)(\theta)$
Consistent with J = 4, 2, 0 and J = 4, 2, 2

G.Bertolini, M.Bettoni, E.Lazzarini, Nuovo Cim. 3, 1162L (1956).

Tb^{161}_{65} $^{96}_{7.15^d}$ τ **7.15^d** Gd^{160}(pile n,$\gamma\beta$)
β^- **0.540** complex?
$\gamma(Dy^{161})$ **0.0256** **0.0748** s ce
0.0277 **0.0783**
0.0489 **0.1062**
0.0573 **0.1321**

Scin $\gamma\gamma$ supports Dy^{161} levels at 0.0256, 0.0748, 0.1040, and 0.1320

J.M.Cork, M.K.Brice, L.C.Schmid, R.G.Helmer, Bull. Am. Phys. Soc. 1, No. 6, 297 R7 (1956).

Tb^{161}_{65} $^{96}_{7.15^d}$ τ **6.9^d** *1* $Gd^{(160)}$(pile n,$\gamma\beta$)
β^- ~1000† **0.500** *3* F-K linear $E_\beta > 0.10$ sl
$\gamma(Dy^{161})$
100† **0.0259** 2 scin,pc
31†* **0.049** 2 $\alpha \sim 1.5$ $\gamma\gamma/\gamma$
57† **0.077** 2 $\alpha_K < 3.5$$
x 150†* **K x ray**

$(E_\beta > 0.20)(0.0259, 0.049, 0.077\gamma)$ scin
$(0.049\gamma\gamma)(0.0259\gamma)$ No $\gamma(0.077\gamma)$
No $\beta(0.106\gamma)$. γ observed but assigned to Gd^{153}
*Assuming α_K = 2.9 for 0.077 γ
$From (0.049$\gamma$+K x ray)/(0.077$\gamma$) = 3.2

A.Bisi, S.Terrani, L.Zappa, Nuclear Phys. 1, 425 (1956).

$\gamma(Dy^{161})$ ~0.046 sl ce
w ~0.073
ce **0.092** (~a few % of β's)

R.Ballini, R.Barloutaud, J. phys. radium 17, 498 (1956).

Dy 66 Levels $Dy(\alpha,\alpha'\gamma)$ E_α = 6; scin
γ **0.076** *1* $\epsilon B(E2)$ = 0.23*
0.166 2 = 0.29$
*Assuming γ due to A = 161, 162, 163 and 164
$Assuming γ due to A = 161 and 163

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Resonances $Dy(n,\gamma)$ pulsed n's
1.72 ev scin γ
5.9
Different γ's emitted at these resonances

A.E.Walters, C.A.Fenstermacher, L.Rosler, R.G.Bennett, C.K.Bockelman, H.L.Schultz, W.G.Wadey, Bull. Am. Phys. Soc. 1, No. 6, 296 R4 (1956).

Dy^{161}_{66} ^{95} ground state
J **5/2** para
$|\mu|$ **0.38*** 5
$|\mu(Dy^{163})/\mu(Dy^{161})|$ = 1.41 2
*If g.s. of Dy^{+++} ion in crystal is $^6H_{15/2}$

A.H.Cooke, J.G.Park, Proc. Phys. Soc. 69A, 282 (1956).

ground state
J **3/2** S
$\mu(Dy^{163})/\mu(Dy^{161})$ = 1.07 5
$q(Dy^{163})/q(Dy^{161}) \sim 1$

K.Murakawa, J. Phys. Soc. Japan 11, 804 (1956).

$Dy^{162}_{66\ 96}$

Level — $Dy^{(162)}(p,p'\gamma)$ — $E_p = 1.75$
γ — **0.082** *1* — $\epsilon B(E2) = 3.2$ — sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab, Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

$Dy^{163}_{66\ 97}$

ground state
J — **5/2** — para
$|\mu|$ — **0.53*** *5*
$|\mu(Dy^{163})/\mu(Dy^{161})| = 1.41$ *2*
*If g.s. of Dy^{+++} ion in crystal is $^6H_{15/2}$

A.H.Cooke, J.G.Park, Proc. Phys. Soc. 69A, 282 (1956).

ground state
J — **3/2*** — S
$\mu(Dy^{163})/\mu(Dy^{161}) = 1.07$ *5*
$q(Dy^{163})/q(Dy^{161}) \sim 1$
*From $J(Dy^{163}) = J(Dy^{161})$[$] and $J(Dy^{161}) = 3/2$

K.Murakawa, J. Phys. Soc. Japan 11, 804 (1956) 1; [$]Phys. Rev. 92, 325 (1953).

$Dy^{164}_{66\ 98}$

Level — $Dy^{(164)}(p,p'\gamma)$ — $E_p = 1.75$
γ — **0.075** *1* — $\epsilon B(E2) = 4.8$ — sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

$Dy^{165}_{66\ 99}$ 2.3^h e.s.

$\gamma(Ho^{165})$ — **0.094793** *7* — cryst

B.Andersson, Proc. Phys. Soc. 69A, 415 (1956).

$\gamma(Ho^{165})$ — **(0.095)** — M1 — scin
$\alpha_K = 2.9$ *3* — K x ray/γ

T.Stribel, Z. Naturf. 10a, 894 (1955).

$Ho^{163}_{67\ 96}$? $\sim 1^S$

τ — $\sim 1^S$ — Ho^{165}($\geq$ 16.3-Mev γ)
γ — **0.305** — scin

M.G.Stewart, A.J.Bureau, C.L.Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

$Ho^{165}_{67\ 98}$

ground state
J — **7/2** — para
$|\mu|$ — **3.29** *17*
$|q|$ — ~ 2 — μ and q have same sign

J.M.Baker, B.Bleaney, Proc. Phys. Soc. 68A, 1090 (1955).

$Ho^{165}_{67\ 98}$

Levels — $Ho^{165}(\alpha,\alpha'\gamma)$ — $E_\alpha = 6$; scin
γ — **0.094** *1* — $\epsilon B(E2) = 0.54$
0.206 *2* — $= 0.036$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

Level — $Ho^{165}(\alpha,\alpha'\gamma)$ — $E_\alpha = 6$
0.206 level
γ — 100† **0.112** — scin
21† **0.206**

G.M.Temmer, N.P.Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

Er_{68}

Levels — $Er(p,p'\gamma)$ — $E_p = 1.75$
γ — **0.081** *1* — $\epsilon B(E2) = 3.6$* — sd ce_L
*If γ is ascribed to all even Er isotopes

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Levels — $Er(\alpha,\alpha'\gamma)$ — $E_\alpha = 6$
γ — **0.079** *1* — $\epsilon B(E2) = 0.83$* — scin
0.172 *1* — $= 0.064$[$]
*If γ is ascribed to all Er isotopes
[$]If γ is ascribed to A = 167

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955); priv. comm.

$Er^{165}_{68\ 97}$ 9.9^h

Er(pile n) chem
Assignment of 9.9^hEr to mass 165 confirmed, ms

D.R.Nethaway, M.C.Michel, W.E.Nervik, Phys. Rev. 103, 147 (1956).

$Er^{167}_{68\ 99}$

ground state
$|\mu|$ — **0.50** *12* — para
$|q|$ — **10** *2*
Recalculated from data of G.S.Bogle et al., Proc. Phys. Soc. 65A, 760 (1952)

R.J.Elliott, K.W.H.Stevens, Proc. Roy. Soc. 219, 387 (1953).

$Er^{167}_{68\ 99}$? 2.5^S

τ — 2.5^S — Er(γ)
γ — **0.210** — scin

M.G.Stewart, A.J.Bureau, C.L.Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

τ — 2.5^S — Er(pile n)
γ — **0.210** *10* — $\alpha_K = 0.55$ *10* — E3 — scin

E.C.Campbell, J.H.Kahn, M.Goodrich, ORNL-1164 (1951).

$Er^{171}_{68\ 103}$ 7.5^h

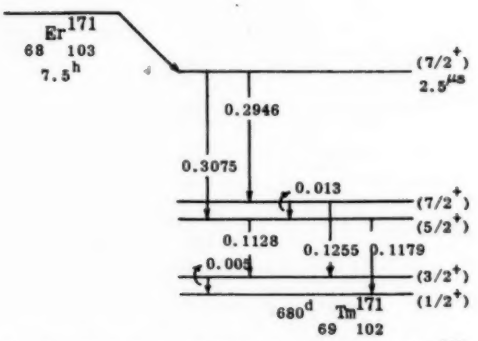
Er(pile n) chem
Assignment of 7.5^hEr to mass 171 confirmed, ms

D.R.Nethaway, M.C.Michel, W.E.Nervik, Phys. Rev. 103, 147 (1956).

$Er^{171}_{68\ 103}$ 7.5^h $\gamma(Tm^{171})$ $Er^{(170)}$(slow n,γ); scin

0.115	(0.1128, 0.1179, 0.1255)*	
0.300	(0.2946, 0.3975)*	

β(0.115, 0.300γ) delay
(0.115 γ)(0.300 γ) No (0.115 γ)(0.115 γ)
No 0.176, 0.420γ (< 1% of 0.300γ)



Level scheme proposed in analogy to that of Tm^{169}

S.D.Koički, A.M.Koički, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 1 (1956); *H.B.Keller, J.K.Cork, Phys. Rev. 84, 1079 (1951).

$Er^{172}_{68\ 104}$ 50^h τ **49.8^h** *10* Er(pile n) chem

From milking $64^h Tm^{172}$(q.v.) from Er

D.R.Nethaway, M.C.Michel, W.E.Nervik, Phys. Rev. 103, 147 (1956).

$Tm^{169}_{69\ 100}$ Stable

	ground state	
J	1/2	S
μ	**-0.205** *20*	

μ agrees very well with the predictions of the collective model of the nucleus*

K.H.Lindenberger, Z. Phys. 141, 476 (1955); Naturwiss. 42, 41 (1955). *B.R.Mottelson, S.G.Nilsson, Z. Phys. 141, 217 (1955).

$Tm^{169}_{69\ 100}$ Level $Tm^{169}(p,p'\gamma)$ E_p = 1.75

0.119 level

γ	**0.111** *1*	$\epsilon B(E2) \sim 2$	sd ce_K
		= 0.32	ce_L
	0.119	= 0.11	ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Level $Tm^{169}(\alpha,\alpha'\gamma)$ E_α = 6

0.120 level

γ	**0.109** *1*	$\epsilon B(E2)$ = 1.40	scin

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955); priv. comm.

$Tm^{170}_{69\ 101}$ 127^d β^- 24%* **0.867** *5* scin $\beta\gamma, \beta_I$
76% **0.950** *5* scin
$\gamma(Yb^{170})$
0.084 α_K = 1.69 *2* scin x/γ
*From $\beta\gamma/\beta$ if α = 8.7 for 0.084γ

A.Bisi, E.Germagnoli, L.Zappa, Nuovo Cim. 3, 1007 (1956).

$\gamma(Yb^{170})$ **(0.084)** Tm^{169}(pile n,γ) chem
K:L:M:N = 100:314:72:9.6 sd ce

P.R.Gray, Phys. Rev. 101, 1306 (1956).

$\gamma(Yb^{170})$ **0.08426** *2* cryst

E.N.Hatch, F.Boehm, J.W.M.DuMond, priv. comm. (1955).

$\gamma(Yb^{170})$ Tm^{169}(pile n,γ)

	107†	**0.084229** *41*	cryst
x	191†	**Yb K x ray**	
	6.4†	**Er K x ray***	

No other γ with $0.070 < E_\gamma < 0.083$, or $0.085 < E_\gamma < 0.090$ (< 2†)
*Not due to $87^d Tm^{168}$ (no 0.85γ) scin

P.P.Day, Phys. Rev. 102, 1572 (1956).

$Tm^{171}_{69\ 102}$ 680^d Er(pile n) chem
Assignment of 680^dTm to mass 171 confirmed, ms

D.R.Nethaway, M.C.Michel, W.E.Nervik, Phys. Rev. 103, 147 (1956).

$Tm^{172}_{69\ 103}$ 64^h

τ	**63.6^h** *3*	Er(pile n) chem, ms	
β^-	**1.5**		a
$\gamma(Yb^{172})$	**0.076**	**1.09**	scin
w	**0.18**	**1.44**	
w	**0.40**	**1.79**	
x	**K x ray**		

D.R.Nethaway, M.C.Michel, W.E.Nervik, Phys. Rev. 103, 147 (1956).

Yb 70 Levels Yb(p,p'γ) E_p = 1.75

γ	**0.077** *1*	$\epsilon B(E2)$ = 3.9*	sd ce_L

*If γ is ascribed to all even Yb isotopes

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Levels Yb($\alpha,\alpha'\gamma$) E_α = 6; scin

	Level	$\epsilon B(E2)$	Isotope
γ	**0.078** *1*	0.49	all but 171
	0.110 *1*	0.25	171
	0.180 *2*	0.065	173

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955); priv. comm.

$Yb^{169}_{70\ 99}$ 31^d τ **30.6^d** 2 $Yb^{(168)}$(pile n,γ)

$\gamma(Tm^{169})$

0.0084					s77 ce
0.0206	K	L_1	L_2	L_3	
0.0632		100	43	55	
0.0936	210	100	18	10	
0.1099	360	100	19	6	
0.1183	9		10		E2
0.1307	150		100	90	
0.1777	56	10			
0.1986	66	10			
0.2610					
0.3083	35		10		

(0.178 γ)(0.131 γ) (0.261 γ)(~0.115 γ)
No (0.261 γ)(0.131, ~0.19, 0.308 γ)
Sum peaks at 0.115, 0.263, 0.317 Σ scin
No 0.143, 0.160 γ s77 ce

J.M.Cork, M.K.Brice, D.W.Martin, L.C.Schmid, R.G.Helmer, Phys. Rev. 101, 1042 (1956); 100, 1237A (1955).

$\gamma(Tm^{169})$

0.00842				sl ce,cryst
0.02075				α_K
0.06312	α_K	**0.17724**		0.51
0.09360	2.4	**0.19797**		0.40
0.10978	2.1	**0.2404**		
0.11820		**0.2610**		
0.13053		**0.3077**		

All γ's fitted into levels at 0.00842, 0.11820, 0.13895, 0.31619, 0.37931, 0.47291

E.N.Hatch, P.Marmier, F.Boehm, J.W.M.DuMond, Bull. Am. Phys. Soc. 1, No. 4, 170 E1 (1956); verbal report.

$\gamma(Tm^{169})$ $Yb^{(168)}$(pile n,γ)

0.063	178†	**0.178**		scin
0.094	226†	**0.198**		
157† **0.110**	20†	**0.260**		
96† **0.132**	95†	**0.308**		

(0.110 γ)(0.178?*, 0.198 γ)
(0.132 γ)(0.178 γ)
Only 0.063 and 0.094γ precede 0.7$^{\mu s}$ level $\gamma\gamma$ delay
No ϵ to 0.120 or 0.142 level xγ delay
(K x ray)(0.063, 0.094, 0.260 γ) delay <0.3$^{\mu s}$
*(0.110 γ)(0.178 γ) <0.1 of (0.132 γ)(0.178 γ)

S.D.Koički, A.M.Koički, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 1 (1956).

$\gamma(Tm^{169})$ $Yb^{(168)}$(pile n,γ)

20%$ (0.023)	146+	**0.178**		scin
250+ **0.064**		~**0.194***		
34+ **0.094**	214+	**0.198**		
144+ **0.110**		~**0.240***		
~**0.120***		~**0.260***		
91+ **0.133**	60+	**0.308**		
x 1130+ K x ray				

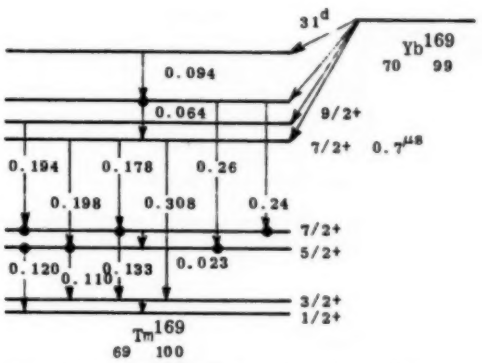
(0.110 γ)(0.178, 0.198, ~0.260 γ)
(0.133 γ)(0.178, ~0.194, ~0.240 γ)
(0.198 γ)(0.110, ~0.120 γ)

Continued

$Yb^{169}_{70\ 99}$ 31^d

Continued

Only 0.064 γ and 0.094 γ precede 0.7$^{\mu s}$ level $\gamma\gamma$ delay
No ϵ to 0.120 or 0.142 level xγ delay
*Observed only in coincidence spectra
$From intensities of (0.110 γ)γ and (0.178 γ) γ
+Photons per 10^3 disintegrations



S.A.E.Johansson, Phys. Rev. 100, 835 (1955).

$Yb^{169}_{70\ 99}$ Resonance $Yb^{(168)}$(n)
0.597 ev Γ_γ = 70 5 mev

V.L.Sailor, H.H.Landon, H.L.Foote, Jr., quoted by H.H.Landon, Phys. Rev. 100, 1414 (1955).

$Yb^{171}_{70\ 101}$

ground state

J	1/2	para
$\|\mu\|$	**0.43** 5	
$\|\mu(Yb^{173})/\mu(Yb^{171})\|$ = 1.39 1		

A.H.Cooke, J.G.Park, Proc. Phys. Soc. 69A, 282 (1956).

ground state

μ	+**0.49** 6	S

K.Krebs, H.Nelkowski, Z. Phys. 141, 254 (1955).

$Yb^{173}_{70\ 103}$

ground state

J	5/2	S
μ	−**0.67** 1	

K.Krebs, H.Nelkowski, Z. Phys. 141, 254 (1955). Ann. Physik 15, 124 (1954).

ground state

J	5/2	para
$\|\mu\|$	**0.60** 5	
$\|\mu(Yb^{173})/\mu(Yb^{171})\|$ = 1.39 1		

A.H.Cooke, J.G.Park, Proc. Phys. Soc. 69A, 282 (1956).

$Yb^{175}_{70\ 105}$ 4.2^d

τ		4.2^d *1*	$Yb^{(174)}$(pile n,γ)
β^-	~25†	0.374 *30*	sd
	100†	0.471 *3*	
$\gamma(Lu^{175})$		0.1141 K/L = 2.9 *4*	sπ ce
		$L_1:L_2:L_3$ = 100:41:27	M1,E2
		0.1378 K/L ~2	
		0.1450	
		0.2829 K/L_2 ~6	
		0.3970 K/L = 5.4 *3*	

J.M.Cork, M.E.Brice, D.W.Martin, L.C.Schmid, R.G.Helmer, Phys. Rev. 101, 1042 (1956); 100, 1237A (1955).

$\gamma(Lu^{175})$	0.39532 *12*	cryst

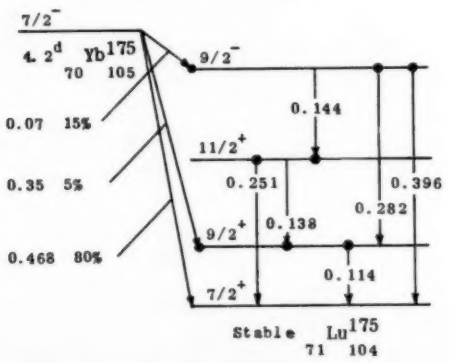
N.Ryde, B.Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

$\gamma(Lu^{175})$		sl ce,cryst
	0.11381	0.2513
	0.13765	0.28257
	0.14485	0.3961

All γ's fitted into levels at 0.11381, 0.25146, 0.39631

F.Boehm, E.N.Hatch, P.Marmier, J.W.M.DuMond, Bull. Am. Phys. Soc. 1, No. 4, 170 E2 (1956).

β^-	15%	0.070 *10*		scin$\beta\gamma$
	5%	0.350 *10*		scin$\beta\gamma$
	80%	0.468 *5*		sl
No 0.317β (< 0.5%)				scin$\beta\gamma$
$\gamma(Lu^{175})$				scin, sπ ce
	7†	0.1136 *2*	α_K = 1.7 *4*•	
		$L_1:L_2:L_3$ = 3:1:1	E2/M1 = 0.30	
	< 1†	0.1376 *2*		
	< 2†	0.144		
	< 1†	0.251		M2/E1
	10†	0.2824 *2*	α_K = 0.038 *10*	0.03
			K/LM ≥ 5	
	23†	0.3960 *2*	α_K = 0.050 *5*	0.20
			K/LM = 5.8	
(0.07β)(0.282, 0.396γ)				scin
(0.35β)(0.114γ)				
(0.144γ)(0.114, 0.138, 0.251γ)				
•From (0.282γ)(K x ray, 0.114γ)				



J.P.Mize, M.E.Bunker, J.W.Starner, Phys. Rev. 100, 1390 (1955); 99, 671A (1955).

$Yb^{177}_{70\ 107}$ 1.8^h

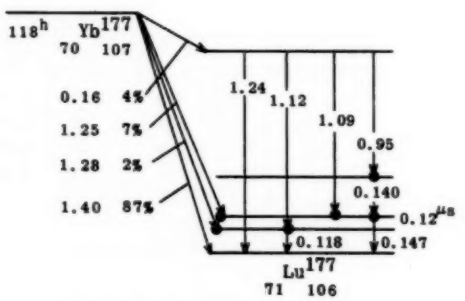
τ		1.88^h *10*	$Yb^{(176)}$(pile n,γ)
$\gamma(Lu^{177})$			
	~25†	0.119	scin $\beta\gamma$
	100†	0.148	scin
	~ 5†	1.080 *5*	
	~ 5†	1.228 *5*	
(E_β > 0.5)(0.119γ)			scin
(1.080γ)(0.148γ) No (1.228γ)(0.148γ)			
Not p $6.8^d Lu^{177}$ (expected decay, ce, and β not observed)			

J.M.Cork, M.K.Brice, D.W.Martin, L.C.Schmid, R.G.Helmer, Phys. Rev. 101, 1042 (1956); 100 1237A (1955); priv. comm. 1955.

$Yb^{(176)}$(th n,γ)

β^-	4%	0.16 *2*		scin β(>0.7γ)
	7%	(1.25)	} energies deduced from proposed decay scheme	
	2%	(1.28)		
	87%	(1.40)		
$\gamma(Lu^{177})$		6†	0.95 *1*	scin
	13†	0.118 *2*	30†	1.09 *1*
	< 10†	0.140 *4*	~4†$	(1.12)
	100†	0.147•*2*	27†	1.24 *1*

•α_K < 0.4 from x/γ
(>0.7β, 0.140γ, 1.09γ)(0.147γ) delay scin
(>0.7β, >1.0γ)(0.118γ) (0.95γ)(0.140γ)
No (0.118γ)(0.147γ)
No 1.11β (<0.2%) from no β(0.140γ)
$From (>0.7$\gamma$)(0.140, 0.118$\gamma$)
β%'s from (>0.15β)(0.147γ)/β and γ intensities using α = 1.5 for 0.118γ



J.P.Mize, M.E.Bunker, J.W.Starner, Phys. Rev. 103, 182 (1956).

Lu ? 71	γ	Lu(γ,?γ)	
	0.131	$\gamma\gamma$ delay = 75$^{\mu s}$	scin

M.G.Stewart, A.J.Bureau, C.L.Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206, R2 (1956); verbal report.

$Lu^{175}_{71\ 104}$

Levels		$Lu^{(175)}(\alpha,\alpha'\gamma)$	E_α = 6; scin
γ	0.114 *1*	ϵB(E2) = 0.72	
	0.250 *3*	= 0.20	

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

$Lu^{175}_{71\ 104}$ Level $Lu^{(175)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$

0.250 level

γ 100† **0.136** scin

92† **0.250**

G.M.Temmer, N.P.Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

$Lu^{176}_{71\ 105}$ Level $Lu^{(176)}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ **0.180** 2 $\epsilon B(E2) = 1.14$

Assignment to Lu^{175} also possible

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150 (1955).

$Lu^{177}_{71\ 106\ 6.8^d}$ $\gamma(Hf^{177})$ **0.11308** *3* cryst

0.20786 *4*

N.Ryde, B.Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

$Lu^{177}_{71\ 106}$ Resonances $Lu^{(176)}(n)$ $E_n = 0.06$ to 3 ev

E_o(ev)	σ_o	Γ_γ(mev)	$g\Gamma_n$(mev)
0.143 *1*	14400	61 *2*	0.046
1.574 *6**	8300	55 *5*	0.26 *3*
2.604 *10*$^\$$	79000	50 *1*	4.5 *1*

*Assignment to Lu^{176} possible

$^\$$Assignment based on activation of $6.8^d Lu$

H.H.Landon, Phys. Rev. 100, 1414 (1955); 92, 656 (1953).

Hf 72 Relative isotopic abundances ms

Hf^{174}	**0.163%** *2*	Hf^{178}	**27.10%** *10*
Hf^{176}	**5.21%** *2*	Hf^{179}	**13.75%** *5*
Hf^{177}	**18.56%** *6*	Hf^{180}	**35.22%** *10*

No Hf^{172}, Hf^{173}, Hf^{185} ($< 2 \times 10^{-5}$%)

No Hf^{175}, Hf^{182}, Hf^{183}, Hf^{184} ($< 5 \times 10^{-5}$%)

No Hf^{181} ($< 3 \times 10^{-5}$%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

$Hf^{175}_{72\ 103\ 70^d}$ $\gamma(Lu^{175})$ $Hf^{174}(n,\gamma)$; scin, sπce

4† **0.0893** 2

$L_1:L_2:L_3$ = 10:1:1 E2/M1 = 0.1

0.1136 2

~1† **0.2293** 2 K/L~2

0.3186 2

100† **0.3429** 2

$L_1:L_2:L_3$ = 10:0:0 E2/M1 ≤ 0.25

K/LM = 5.0

~2† **0.4322** 2

(0.343γ)(K x ray, 0.089 γ) and relative photon intensities indicate ~20% ϵ to 0.432 level, ~80% ϵ to 0.343 level, <10% ϵ to g.s.

J.P.Mize, M.E.Bunker, J.W.Starner, Phys. Rev. 100, 1390 (1955).

$Hf^{175}_{72\ 103\ 70^d}$ $\gamma(Lu^{175})$

0.08936	sl ce,cryst
0.11381	**0.3189**
0.16133	**0.34340**
0.22957	**0.4328**

0.06169 photon interpreted as Lu $K_{\beta 5}$ x ray

All γ's fitted into levels at 0.11381, 0.34340, 0.43276, 0.50473

F.Boehm, E.N.Hatch, P.Marmier, J.W.M.DuMond, Bull. Am. Phys. Soc. 1, No. 4, 170 E2 (1956); verbal report.

$Hf^{176}_{72\ 104}$ Level $Hf^{176}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ **0.087** *1* $\epsilon B(E2) = 0.56$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$Hf^{177}_{72\ 105}$

	ground state	enriched Hf^{177}
J	7/2	S
μ	+**0.61** *3*	
q	+3 *1*	

$q(Hf^{177})/q(Hf^{179}) = 0.99$ *2*

D.R.Speck, F.A.Jenkins, Phys. Rev. 101, 1831 (1956); Bull. Am. Phys. Soc. 1, No. 6, 282 C3 (1956).

Levels $Hf^{177}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ **0.112** *1* $\epsilon B(E2) = 0.77$

0.250 *3* $= 0.55$

H.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level $Hf^{177}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$

0.250 level

γ 10† **0.138** scin

48† **0.250**

G.M.Temmer, N.P.Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

$Hf^{178}_{72\ 106}$ Level $Hf^{178}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ **0.090** *1* $\epsilon B(E2) = 0.85$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Resonances $Hf^{(177)}(n)$ $E_n = 0.5$ to 7 ev

$\sigma_o(10^3 b)$	E_o(ev)	Γ_γ(mev)	Γ_n(mev)
6.55 *12*	**1.100** *5*	67 *2*	2.10 *5*
1.35 *2*	**2.39** *1*	60 *1*	9.3 *2*

Assumed g = 1/2

G.Igo, H.H.Landon, Phys. Rev. 101, 726 (1956).

$Hf^{178}_{72\ 106}$ Resonances $Hf^{(177)}(n)$ chopper

$\sigma_o(10^3 b)$	E_o(ev)	Γ_γ(mev)	Γ_n(mev)
	(2.38)	63 *8*	7 *1*
40 *20*	6.5 *1*	44 *20*	11 *2*

Assumed g = 1/2

J.S.Levin, D.J.Hughes, Phys. Rev. 101, 1328 (1956).

$Hf^{179}_{72\ 107}$

	ground state	enriched Hf^{179}
J	9/2	S
μ	−0.47 *3*	
Q	+3 *1*	

$\mu(Hf^{177})/\mu(Hf^{179}) = -1.276\ 8$

$Q(Hf^{177})/Q(Hf^{179}) = 0.99\ 2$

D.R.Speck, F.A.Jenkins, Phys. Rev. 101, 1831 (1956); Bull. Am. Phys. Soc. 1, No. 6, 282 C3 (1956).

Levels $Hf^{179}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ	0.119 *1*	$\epsilon B(E2) = 0.67$
	0.260 *3*	$= 0.056$

N.P.Heydenburg, G.M.Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

Level $Hf^{179}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$

0.260 level

γ	100† 0.141	scin
	81† 0.260	

G.M.Temmer, N.P.Heydenburg, Bull. Am. Phys. Soc. 1, No. 1, 43, K11 (1956); verbal report.

$Hf^{180}_{72\ 108}$ 5.5^h

γ	(0.057)*	$L_1L_2/L_3 \sim 5$ $\alpha_L \sim 0.4$ E1	s77 ce
80%	(0.444)		sl pe
20%	0.501		

*γ lifetime (10^{-15} single proton estimate) ascribed to K-forbiddenness ($\Delta K = 9$)

G.Scharff-Goldhaber, M.McKeown, J.W.Mihelich, Bull. Am. Phys. Soc. 1, No. 4, 206 R3 (1956); verbal report.

$Hf^{180}_{72\ 108}$ Level $Hf^{180}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

γ	0.093 *1*	$\epsilon B(E2) = 0.78$

N.P. Heydenburg, G.M. Temmer, Phys. Rev. 100, 150; 98, 1198A (1955).

$Hf^{181}_{72\ 109}$ 46^d

$\gamma(Ta^{181})$ (0.133) E2 = 100% $ce_K\gamma(\theta)$,

(0.482) E2/M1 = 34 to 55 $\gamma\gamma(\theta)$

or E2/M1 = 8 to 23 $\gamma ce_K(\theta)$

$(0.133\gamma)(ce_K\ 0.482\gamma)(\theta)$* } J = 1/2, 5/2, 7/2

$(0.133\gamma)(0.482\gamma)(\theta)$

*Magnetic attenuation of correlation coefficients due to electron rearrangement shown

F.Gimmi, E.Heer, P.Scherrer, Helv. Phys. Acta 29, 147 (1956); 28, 470A (1955).

$Hf^{181}_{72\ 109}$ 46^d

$\gamma(Ta^{181})$ (0.133) E2 = 100% $ce_K\gamma(\theta)$,

(0.482) E2/M1 = 43.5* $\gamma\gamma(\theta)$

$(ce_K\ 0.133\gamma)(0.482\gamma)(\theta)$$ } J = 1/2, 5/2, 7/2

$(0.133\gamma)(0.482\gamma)(\theta)$

*Assuming no quadrupole attenuation of angular correlation coefficients

E.Heer, R.Rüetschi, F.Gimmi, W.Kündig, Helv. Phys. Acta 28, 336A (1955); P.Gimmi, E.Heer, P.Scherrer, Helv. Phys. Acta 28, 470A (1955).

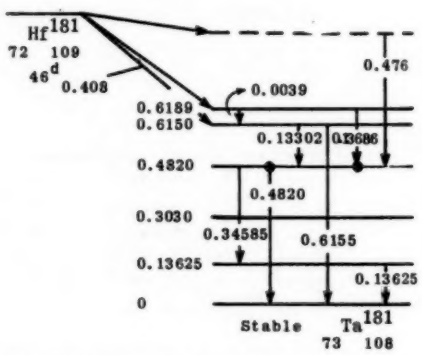
$(0.133\gamma)(0.482\gamma)(\theta)$ $J = 1/2^+, 5/2^+, 7/2^+$ $\gamma\gamma(L)$

P.H.Stelson, F.K.McGowan, Bull. Am. Phys. Soc. 1, No. 5, 264 F6 (1956); F.K.McGowan, Phys. Rev. 93, 471 (1954).

$\gamma(Ta^{181})$

	0.00390 *10*		s77, sl ce, cryst
7†	0.13302 *2*	$\alpha_K = 0.49$	
		$L_1:L_2:L_3 = 10:48:38$	
1†	0.13625 *2*	$\alpha_K = 1.2$	
		$L_{12}:L_3 = 10:17$	
0.3†	0.13686 *4*	$\alpha_K = 0.9$	
2.3†	0.34585 *20*	$\alpha_K = 0.04$	K/L = 4
~0.3†	0.4760 *2*	$\alpha_K = 0.06$	K/L = 4.3
14†	0.4820 *2*	$\alpha_K = 0.027$	K/L = 4.7
0.04†	0.6155 *5*	$\alpha_K = 0.12$	

$(ce_K\ 0.13686\gamma)(0.482\gamma)$ s



F.Boehm, P.Marmier, Phys. Rev. 103, 342 (1956).

$Hf^{183}_{72\ 111}$ 64^m

τ	64^m *3*	$W^{(186)}$(≤32-Mev n,α) chem
β^-	~1.4	a
$E_\gamma/\beta \sim 0.8$ Mev/β		GM

O.O.Gatti, J.Flegenheimer, Z. Naturf. 11a, 679 (1956).

Ta 73

Relative isotopic abundances ms

Ta^{180} 0.0123% *3*

Ta^{181} 99.9877% *3*

No Ta^{177}, Ta^{178}, Ta^{179} ($< 3 \times 10^{-4}$%)

No Ta^{182}, Ta^{183} ($< 2 \times 10^{-4}$%)

P.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956); 97, 566 (1955).

$_{73}Ta^{178}_{105}$ $22^d W^{178}$ source

No $\gamma^{\pm}$ (<1 †) No 1.5γ (<1.4 †) scin

No 15.4^d activity reported

†Photons per 100 $22^d W^{175}$K x ray

A. Bisi, E. Terrani, L. Zappa, Nuovo Cim. 3, 661 (1956).

$_{73}Ta^{180}_{107}$ τ $>10^{12}$y ms

From abundance of W^{180} in Ta ores

P. Eberhardt, J. Geiss, C. Lang, W. Herr, E. Merz, Z. Naturf. 10a, 796 (1955).

$_{73}Ta^{181}_{108}$

Level	$Ta^{181}(\alpha,\alpha'\gamma)$	$E_\alpha = 3.45$
γ	**(0.137)** K/L = 6.3	sπ ce

E. M. Bernstein, H. W. Lewis, Phys. Rev. 100, 1345; 99, 617A (1955).

Level	$Ta^{181}(\alpha,\alpha'\gamma)$	$E_\alpha = 3.0$
γ	**(0.137)** $\alpha_K = 1.05$ *15*	scin x/γ

F. K. McGowan, P. H. Stelson, Phys. Rev. 103, 1133 (1956).

γ	$Ta^{181}(p,p'\gamma)$	$E_p = 1.75$
0.136 *1*	εB(E2) = 1.4	sd ce_K
	= 0.21	ce_L
0.165 *1*	~0.2	ce_K
	~0.03	ce_L

T. Huus, J. H. Bjerregaard, B. Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Levels $Ta^{181}(p,p'\gamma)$ $E_p = 2.9$; scin

0.137 level

γ	**0.137** *3*	B(E2) = 1.8* (α = 2.1)

0.302 level

γ	**0.137** *3*	
1.6†	**0.165** *4*	
1†	**0.302** *4*	B(E2) = 0.5* (α = 0.08)

*Corrected for anisotropy

A. S. Divatia, R. H. Davis, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Levels $Ta^{181}(\alpha,\alpha'\gamma)$ $E_\alpha = 6$; scin

0.136 level

γ	**0.136** *1*	εB(E2) = 0.70

0.303 level

γ	**0.136** *1*	
1.1†	**0.167** *2*	
1†	**0.303** *3*	εB(E2) = 0.15

(0.136γ)(0.167γ)

N. P. Heydenburg, G. M. Temmer, Phys. Rev. 100, 150 (1955); Bull. Am. Phys. Soc. 1, No. 1 43 K11 (1956); verbal report.

$_{73}Ta^{181}_{108}$

Levels $Ta^{181}(p,p'\gamma)$ $E_p = 3.7$; scin

0.137 level

γ	**(0.137)**	B(E2) = 1.75

0.303 level

γ	**(0.137)**	
1.4†	**(0.166)**	
1†	**(0.303)**	

(0.137γ)(0.166γ)

E. A. Wolicki, L. W. Fagg, E. H. Geer, Phys. Rev. 100, 1265A (1955); verbal report.

Level $Ta^{181}(p,p'\gamma)$ scin

0.303 level

γ	**(0.137)**	
1.7†	**(0.166)**	
1†	**(0.303)**	

H. Mark, G. Paulissen, Phys. Rev. 99, 1654A (1955).

0.480 level $46^d Hf^{181}$ source

J	5/2	$\gamma\gamma(\theta)$
μ	+3.25 *17*	$\gamma\gamma(\theta,H)$

E. Heer, R. Rüetschi, F. Scherrer, Z. Naturf. 10a, 834 (1955); Helv. Phys. Acta 28, 336A (1955).

Level $Ta^{181}(\gamma,\gamma')$ $E_\gamma \leq 24$

(0.615)

γγ delay = $18.5^{\mu s}$ *25*

S. H. Vegors, Jr., P. Axel, Phys. Rev. 101, 1067 (1956).

Level $Ta^{181}(n,n'\gamma)$

(0.615)

nγ delay = $18^{\mu s}$ *3* pulsed neutrons

E. C. Campbell, P. H. Stelson, ORNL-2076 p. 32 (1956).

γ $Ta^{181}(n,n'\gamma)$ $E_n = 2.56$ scin

σ(95°)	E_γ
36 *5*	**0.137** *2*
19 *3*	**0.164** *4*
11 *3*	**0.350** *4*
68 *9*	**0.485** *5*

σ units: mb/sterad

R. B. Day, Phys. Rev. 102, 767 (1956).

γ	$Ta^{181}(n,n'\gamma)$	$E_n = 0.35$ to 3.9 scin
0.14	**0.35**	
0.16	**0.48**	
0.21	**0.62**	

R. B. Day, A. E. Johnsrud, D. A. Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$Ta^{182}_{73\ 109}$ $^{111^d}_{K.S.}$

$\gamma(W^{182})$	1.1216	2			sd pe
	1.1894	2	4†	1.254 2.5	
	1.2220	2	3†	1.273 2.5	
	(1.231)		2†	(1.289)	

No 1.375, 1.437, 1.454γ (<0.3†)

G. Bäckström, Arkiv Fysik 10, 387 (1956).

$Ta^{182}_{73\ 109}$ Resonance $Ta^{181}(n)$ 4.28 ev $\Gamma_\gamma = 49$ 6 mev

R.E.Wood, quoted by H.H.Landon, Phys. Rev. 100, 1414 (1955).

Resonances E_o(ev)	$Ta^{181}(n,\gamma)$	chopper
(4.28)	0.260γ observed	scin
(10.38)	0.260γ observed	
(13.95)	0.260γ not observed	

R.G.Bennett, A.E.Walters, C.A.Fenstermacher, L.Rosler, Bull. Am. Phys. Soc. 1, No. 1, 62, UA5 (1956).

Resonances	$Ta^{181}(n,\gamma)$			pulsed n's
35.5 ev	84.9			scin γ
39.2	89.4	126.2	194.5	231.8
49.1	91.1	136.2	199.4	236.4
57.5	96.7	138.1	203.8	241.8
63.0	99.0	143.9	207.9	246.6
76.7	103.3	148.1	215.4	258.4
77.5	105.3	149.4	219.3	263.0
78.7	114.7	166.0	221.6	272.2
82.7	118.0	175.1	224.5	275.7

G.Grimm, J.S.Desjardins, J.Rosen, J.Rainwater, W.W.Havens, Jr., Bull. Am. Phys. Soc. 1, No. 4, 176 F14 (1956); verbal report.

Resonances		Ta^{181}(n; n,γ)		pulsed n's	
E_o(ev)	Γ_n^{o*}	E_o(ev)	Γ_n^{o*}	E_o(ev)	Γ_n^{o*}
63.2	1.0	91.1	0.38	126.0	4.3
76.7	1.6	96.7	0.43	135.9	2.0
77.5	0.74	99.0	12	138.0	1.6
78.6	0.41	103.2	0.09	143.6	0.20
82.7	1.8	105.4	3.0	148.0	0.39
84.9	0.67	114.8	4.1	149.2	0.66
89.4	0.48	118.0	0.22	165.5	0.82
				175	14

*Assuming g = 1/2; units: mev

Resonances also observed at 178, 181.5, 185, 188, 194.5, 199.4, 204, 207.9, 212, 214.5, 216.3, 219.5, 221, 224.5 ev

J.Rainwater, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

$Ta^{182}_{73\ 109}$ Resonances Ta^{181}(n)

$\sigma_o(10^3 b)$	E_o(ev)	Γ_n^o(mev)*	chopper Γ_γ(mev)
12 4	10.2 1	1.15 19	54 10
2.4 8	13.6 1	0.26 3	36 8
1.1 4	18.6 2	0.18 2	85 20
1.5 7	20.1 2	0.26 4	50 15
0.30 4	22.3 3	0.055 7	
16 7	23.7 4	1.8 4	21 8
	29.9 5	0.066 15	
	35.0 6	9.5 3	
	38.9 7	7.6 6	
	48 10	0.6 1	
	51.0 5	0.7 1	
	57.4 6	0.21 10	
	63.1 15	0.7 3	
	77 1	1.7 9	
	83 2	2.1 4	
	98 2	~10	
	105 1.5	8 3	
	114.9 17	9.1 37	
	126.5 20	7.2 41	
	135.5 2.3	4.9 3	
	173 3	7.4 5	
	197 4	6 5	
	211 5		
	297 7		

*Assuming g = 1/2

J.A.Radkevich, V.V.Vladimirsky, V.V.Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

$Ta^{186}_{73\ 113}$ $^{10^m}$

τ	10.5^m 5	W^{186}(20-Mev n,p) chem		
		not by W(≤28-Mev γ)		
β^-	2.2			scin
$\gamma(W^{186})$		45†	0.51	scin
25†	0.125	45†	0.61	
100†	0.200	65†	0.73	
25†	0.300	15†	0.94	
20†	0.410	≤10†	~1.1	
(2.2 β)γ				

A.J.Poë, Phil. Mag. 46, 1165 (1955).

W ? 74

γ	W(γ,n?γ)	$E_\gamma \geq 8.3$;	scin
	0.366	$\gamma\gamma$ delay = 14.6$^{\mu s}$ 3	

M.G.Stewart, A.J.Bureau, C.L.Hammer, Bull. Am. Phys. Soc. 1, No. 4, 206 R2 (1956); verbal report.

γ	W(γ,n?γ)	$E_\gamma \leq 24$;	scin
	0.370 15	$\gamma\gamma$ delay = 16$^{\mu s}$ 1	
		$\alpha \sim 0.25$	x/γ

S.H.Vegors,Jr., P.Axel, Phys. Rev. 101, 1067 (1956).

W 74

τ	2.2x10^{17}y	natural W; ppl
α	3.0 2	ppl
Activity not due to mass 178 or 179		ms

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956).

W^{178} 74 104 22^d

τ **22.0^d** 5 Hf(52-Mev α) chem
x 100† **K x ray** scin
No 0.27γ (<0.6†)

A.Bisi, S.Terrani, L.Zappa, Nuovo Cim. 3, 661 (1956).

W^{179} 74 105 40^m E.S.

τ **40^m** Ta^{181}(p,3n)
$\gamma(Ta^{179})$ **0.030**

T.J.Rock, Proc. Roy. Soc. Canada 50, 28A (1956).

$W^{179?}$ 74 105 $\sim 7^m$

τ **$\sim 7^m$** Ta^{181}(p,3n)
$\gamma(W^{179?})$ **0.222**

T.J.Rock, Proc. Roy. Soc. Canada 50, 28A (1956).

W^{181} 74 107 145^d

τ **145^d** 5 Hf(52-Mev α) chem
No β^+, no ce sl
No γ with $E_\gamma \sim 0.15$ ($<10^{-3}$% of K x ray)
No other γ
(L x ray)/(K x ray) = 0.39 *1*
from which $\epsilon_L/\epsilon_K = 1.54$
and $E_{dis} = 0.092$ *9*

A.Bisi, S.Terrani, L.Zappa, Nuovo Cim. 3, 661 (1956); 1, 651 (1955).

W^{182} 74 108

Level $W^{(182)}(p,p'\gamma)$ $E_p = 1.75$
γ **0.100** *1* εB(E2) = 2.7 sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

W^{183} 74 109

Level $W^{183}(\alpha,\alpha'\gamma)$ $E_\alpha = 1.45$
γ **0.046** *1* εB(E2) ~0.5 sd ce_{MN}

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Resonance	$W^{(182)}$(n)			cryst
E_o(ev)	σ_o	Γ_γ(mev)	Γ_n(mev)	
4.14 *3*	19000 46 *2*		1.43 *3*	

H.H.Landon, Phys. Rev. 100, 1414 (1955).

W^{184} 74 110

Level $W^{(184)}(p,p'\gamma)$ $E_p = 1.75$
γ **0.112** *1* εB(E2) = 1.7 sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

W^{185} 74 111 73^d E.S.

$\gamma(Re^{185})$
15% **~0.058** α~3.3 scin
Compared W^{185} $\beta\gamma/\beta$ with Tm^{170} $\beta\gamma/\beta$ using $\alpha_L = 3$ for 0.084γ of Tm^{170} and $\omega_L = 0.11$

S.K.Bhattacherjee, S.Raman, Nuovo Cim. 3, 1131 (1956).

W^{186} 74 112

Level $W^{(186)}(p,p'\gamma)$ $E_p = 1.75$
γ **0.123** *1* εB(E2) = 1.4 sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Re 75

Resonances Re(n) E_n = 1 to 13 ev cryst

2.156 4* ev	
4.416 8$	**11.1**
5.90	**11.9**
7.2	**12.8**

*Re^{186}, Re^{188}, q.v.

G.Igo, Phys. Rev. 100, 1338; 99, 610A (1955).

Re^{185} 75 110

Level $Re^{(185)}(p,p'\gamma)$ $E_p = 1.75$
γ **0.125** *1* εB(E2) ~0.3 sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Level $Re^{185}(\alpha,\alpha'\gamma)$ $E_\alpha = 3.0$
γ **0.128** $\alpha_K = 2.10$ *43* scin x/γ
p, $(0.128\gamma)(\theta)$ is isotropic

P.K.McGowan, P.H.Stelson, Phys. Rev. 103, 1133 (1956).

Levels $Re^{(185)}(p,p'\gamma)$ $E_p = 3.2$; scin

0.125 level

γ **0.125** *4* B(E2) = 1.2 (α = 4.5)

0.280 level

γ **0.125** *4*
8† **0.158** *5*
1† **0.280** *10* B(E2) = 0.5 (α = 0.15)

R.H.Davis, A.S.Divatia, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Levels $Re^{185}(p,p'\gamma)$ $E_p = 3.7$; scin

0.126 level

γ **0.126** B(E2) = 1.2* (α = 4.5)

0.286 level

γ **0.126**
4.0† **0.160**
1† **0.286**
(0.126γ)(0.160γ)

E.A.Wolicki, L.W.Fagg, E.H.Geer, Phys. Rev. 100, 1265A (1955); *verbal report.

Re^{186} 75 111 3.7^d

τ	3.704^d 84	$Re^{(185)}$(pile n,γ)	
β^-	0.9335* 30		sl $\beta\gamma$
	1.0715* 13		sl
$\gamma(W^{186})$	0.12267 21	K/L = 0.72	sl ce
		$ce_K/10^4$ β's = 43	
$\gamma(Os^{186})$		K/L = 0.65	
1000†	0.13719 7	$ce_K/10^4$ β's = 430	
7.0†	(0.627)		scin
3.4†	(0.764)		
(W K x ray)/(Os K x ray) = 1.9[$]			cryst
(0.934β)/(total β's) = 0.24 1.5			sl
No β^+ ($<2\times10^{-4}$%)			

*P-K plot non-linear, not $\Delta J = 2$, yes shape

F.T.Porter, M.S.Freedman, T.B.Novey, F.Wagner, Jr., Phys. Rev. 103, 921 (1956); [$]P.Day, ibid.

$\beta(0.137\gamma)(\theta)$ graph given for $E_\beta = 0.15$ to 0.80 $\eta(\pi)$ increases with E_β from 0.02 to 0.158 6 scin

T.B.Novey, M.S.Freedman, F.T.Porter, F. Wagner, Jr., Phys. Rev. 103, 942 (1956); 98, 214; 99, 671A (1955).

$\gamma(Os^{186})$ 0.13722 3 cryst

N.Ryde, B.Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

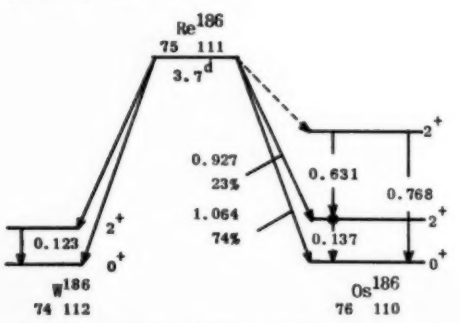
Re^{186} 75 111

Resonance $Re^{(185)}$(n) cryst

E_o(ev)	σ_o	Γ_γ(mev)	$g\Gamma_n$(mev)
2.156 4	12300	55.7 6	3.30 5

G.Igo, Phys. Rev. 100, 1338; 99, 610A (1955).

β^- 240†	0.927 2	$Re^{(185)}$(pile n,γ); sd	
760†	1.064 2		
ϵ_K 32†			
$\gamma(W^{186})$ 6†	0.1229 4	K/L = 0.43	sd pe,ce
$\gamma(Os^{186})$			
100†	0.1372 2	K:L:MN 47:76:14	
	α_K = 0.45	from $(\beta x)/(\beta\gamma)$ = 0.43 3	
0.2†	0.6308 8		sd pe
0.2†	0.7682 10		
x 75†	K x rays		scin
(0.631γ)(0.137γ)	No (0.768γ)(0.137γ)		scin
$\beta(0.137\gamma)$ delay ~0.9[mμs]			



M.W.Johns, C.C.McMullen, I.R.Williams, S.V. Nablo, Can. J. Phys. 34, 69 (1956); Phys. Rev. 91, 418 (1953).

Re^{187} 75 112

Level $Re^{(187)}$(p,p'γ) E_p = 1.75

γ 0.135 1 $\epsilon B(E2) \sim 0.2$ sd ce_L

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

Level $Re^{187}(\alpha,\alpha'\gamma)$ E_α = 3.0

γ 0.134 α_K = 1.50 29 scin x/γ

p,(0.134γ)(θ) is isotropic

F.K.McGowan, P.H.Stelson, Phys. Rev. 103, 1133 (1956).

Levels $Re^{(187)}$(p,p'γ) E_p = 3.2; scin

0.135 level

γ 0.135 4 B(E2) = 2.0 (α = 4.5)

0.300 level

γ 0.135 4

5.4† 0.163 5

1† 0.300 10 B(E2) = 0.65 (α = 0.15)

R.H.Davis, A.S.Divatia, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Levels Re^{187}(p,p'γ) E_p = 3.7; scin

0.135 level

γ 0.135 B(E2) = 1.1* (α = 4.5)

0.303 level

γ 0.135

3.8† 0.168

1† 0.303

(0.135γ)(0.168γ)

E.A.Wolicki, L.W.Fagg, E.H.Geer, Phys. Rev. 100, 1265A (1955); *verbal report.

Level Re^{187}(p,p'γ) scin

0.320 level

γ 0.139

4.7† 0.181

1† 0.320

H.Mark, G.Paulissen, Phys. Rev. 99, 1654A (1955).

Re^{188} 75 113 17^h g.s.

β^-	~1%	<1.9	$Re^{(187)}$(pile n,γ); sd		
	20%	1.961 2			
	79%	2.116 2			
$\gamma(Os^{188})$					sd pe,ce
9000†	0.1550 2		α_K = 0.40	$(\beta x)/\beta\gamma$	
			K:L:M:N = 30:38:9:3		
			$L_1:L_2:L_3$ = 30:14:10		E2
40†	0.4536 6				sd pe
630†	0.4782 2		α_K = 0.06		sd pe,ce
1000†	0.6330 1	53†	1.3079* 7		sd pe
93†	0.6726 5	70†	1.6098 8		
330†	0.8280 2	15†	1.7830 7		
410†	0.9310 1	27†	1.8027 8		
67†	1.1328 8	12†	1.959 2		

Continued

$Re^{188}_{75\ 113}$ 17^h E.S.

Continued

(0.155 γ)(all γ's except 0.633 and 1.959 γ)
(0.633 γ)(0.454?, 0.672?, 0.828, 1.133, 1.308 γ)
No (1.959 γ) γ
No 0.375, 1.086 γ (<10†) No 1.460 γ (<20†)
γ(0.155 γ) delay ~0.9 μμs
Proposed decay scheme accommodates all γ's
*Double

M.W.Johns, C.C.McMullen, I.R.Williams, S.V. Nablo, Can. J. Phys. 34, 69 (1956); Phys. Rev. 91, 418 (1953).

γ(Os^{188})		Re(187)(pile n,γ)		
1010†	0.150	58†	0.910	scin
120†	0.480	27†	1.130	
160†	0.630	22†	1.300	
3†	0.660*	21†	1.600	
65†	0.820	10†	1.770	

(0.48 γ)(0.15 γ)(θ) J = 2, 2, 0 & 0.48 γ 99.6% E2
No (0.15 γ)(0.63 γ)
*Observed only with (0.15 γ)γ

V.R.Potnis, V.S.Dubey, C.E.Mandeville, Phys. Rev. 102, 459 (1956); Bull. Am. Phys. Soc. 1, No. 1, 42 K7 (1956).

γ(Os^{188}) 0.15487 5 cryst

N.Ryde, B.Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

$Re^{188}_{75\ 113}$

Resonance	Re(187)(n) E_o(ev)	σ_o	Γ_γ(mev)	$g\Gamma_n$(mev)	cryst
	4.416 8	1560	45 1	0.32 1	

G.Igo, Phys. Rev. 100, 1338; 99, 610A (1955).

$Os^{}_{76}$ No α's $\tau > 1x10^{17y}$ for $1.5 < E_\alpha < 2.5$; ppl

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956).

Resonances	Os(n) E_o(ev)	$g\Gamma_n$(mev)	chopper Γ_γ(mev)
	6.73 8	0.197 25	67 10
	8.85 11	0.745 90	67 10
	10.30 15	0.31 4	86 14
	12.6 2	0.11 2	
	18.8 3	0.70 7	44 10
	22.0 4	1.86 22	62 14
	27.9 6	3.17 55	
	38.8 10	7.0 10	
	41.2 10	0.55 8	
	44.3 10	4.8 12	

Continued

$Os^{}_{76}$

Continued

50.6	14	7.1	16
55.8	18	5.4	15
63.1	20	22	5
66.4	20	3.9	9
78.2	30	62	22
89.9	40	42	17

J.A.Radkevich, V.V.Vladimirsky, V.V.Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$Os^{185}_{76\ 109}$ 97^d

γ(Re^{185})			scin, sl ce
	0.0725		
	0.125		
	0.162	0.647	
	0.234	0.875	

C.H.Pruett, R.G.Wilkinson, Phys. Rev. 100, 1237A (1955).

$Os^{190}_{76\ 114}$ 10^m

τ		10^m 2	d 3.2^hIr chem
γ	75†	0.186	scin
	90†	0.356	
	100†	0.510	
	92†	0.620	
x	23†	K x ray	

0.186, 0.356, 0.510, 0.620 γ's in 4-fold coinc.

A.H.W.Aten, Jr., G.D.de Feyfer, M.J.Sterk, A.H.Wapstra, Physica 21, 740, 990 (1955).

$Ir^{}_{77}$ No α's $\tau > 1x10^{17y}$ for $1.5 < E_\alpha < 2.5$; ppl

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956).

Resonances	Ir(n) E_o(ev)	E_n = 0.45 to 30 ev E_o(ev)	cryst
	0.654 2*		
	1.303 5$	9.9	
	5.36 4*	~19.5	
	6.1	~25.5	
	9.03	~31	

*Ir^{192}, Ir^{194}, q.v.

H.H.Landon, Phys. Rev. 100, 1414 (1955); 99, 610A (1955).

Resonances	Ir(n) E_o(ev)	$g\Gamma_n$(mev)	chopper Γ_γ(mev)
	5.36	3.4 13	31 14
	6.125	0.15 1	44 7
	9.05	1.84 25	57.5 86

Continued

^{77}Ir

Continued

E_o(ev)	$g\Gamma_n$*	E_o(ev)	$g\Gamma_n$*	E_o(ev)	$g\Gamma_n$*
9.89	0.14 *1*	24.25	24 *5*	50.8	52 *17*
10.4	0.049 *5*	29.2	7 *1*	61.2	22 *4*
10.8		30.6	2.4 *5*	66.3	51 *11*
11.2		35.2	0.9 *2*	75.6	69 *17*
18.7	0.81 *16*	39.7	4 *2*	93.5	141 *38*
19.65	0.61 *10*	41.7	37 *9*		

*units: mev

J.A.Radkevich, V.V.Vladimirsky, V.V.Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$^{77}Ir^{190}_{113}$ 3.2^h

β^+ 2.04 *7* $Ir^{(191)}$ (fast n,2n) chem scin

p 10^mOs chem

A.H.W.Aten, Jr., G.D.de Feyfer, M.J.Sterk, A.H.Wapstra, Physica 21, 740, 990 (1955).

$^{77}Ir^{191}_{114}$

Levels $Ir^{(191)}$(p,p'γ) E_p = 3.2; scin

0.133 level

γ 0.133 4 B(E2) = 0.8 (α = 4.4)

0.356 level

γ 0.133 4

1.1† 0.216 *6*

1† 0.356 *8* B(E2) = 0.9 (α = 0.04)

R.H.Davis, A.S.Divatia, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

$^{77}Ir^{192}_{115}$ 74^d g.s.

β^- <0.5%* (0.100)* $Ir^{(191)}$(pile n,γ)

7%* (0.257)*

41%* (0.537)* 48%* 0.673 *10* sd

No β^+ (< 10^{-4}%) cryst $\gamma^\pm$

ϵ 3.5%* sd ce,cryst

$\gamma(Os^{192})$

			α_K	α_{L1L2}	α_{L3}
4.6†	0.20131	4	0.30	0.12	0.07
39†	0.20575	4	0.16	0.077	0.04
6†	0.28335	*20*	0.04		
19†	0.3747	*5*			
39†	0.48475	*23*	0.022		
0.5†	1.060	*30*			

$\gamma(Pt^{192})$

1.9†	0.13633	2	1.0	0.63	0.44
360†	0.29594	9	0.065	0.025	0.006
350†	0.30845	9	0.069	0.028	0.008
1000†	0.31646	9	(0.054)§	0.018	0.006
16†	0.4166	7	0.019		
640†	0.46798	22	0.022	0.0052	0.001
71†	0.5884	6	0.011	0.0031	
140†	0.6045	9	0.016	0.0031	
84†	0.6129	9	0.011	0.0023	
1†	0.785	*20*			
5†	0.885	2	0.007		

(0.468γ)(0.316γ)(θ) J = 4, 2, 0

(0.588γ)(0.613γ)(θ) J = 4, 2, 0

(~0.30γ)(0.885γ)

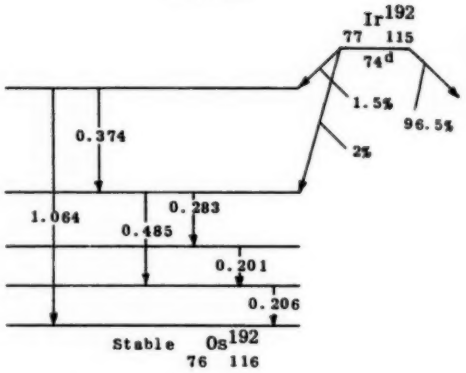
*Not measured, determined from γ transitions

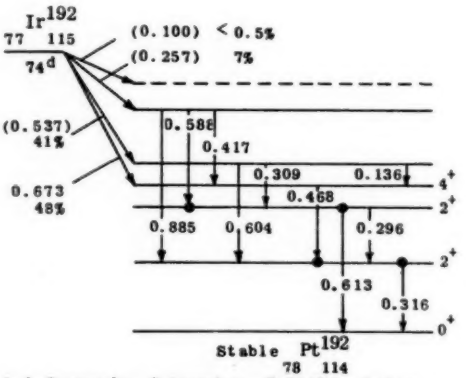
§α's based on this theoretical α_K(E2)

Continued

$^{77}Ir^{192}_{115}$ 74^d g.s.

Continued





L.L.Baggerly, P.Marmier, P.Boehm, J.W.M. DuMond, Phys. Rev. 100, 1364 (1955).

$\gamma(Os^{192})$ 0.282 $Ir^{(191)}$(pile n,γ)

0.4840 sd pe,ce

$\gamma(Pt^{192})$

0.2870	0.4380
0.2940	0.4675
0.3080	0.5900
0.3160	0.6040
0.4190	0.6130

γ(?) 0.430

0.4226 Pb pe ascribed to $\gamma^\pm$

Electrons studied in energy range 0.18 to 0.55

P.Grard, L.Danguy, J.Franeau, J. phys. radium 16, 839 (1955).

$\gamma(Os^{192})$

0.58† 1.053 sπ Cp

$\gamma(Pt^{192})$

445†	0.29 to 0.32
256†	(0.468)
100†	0.58 to 0.62
2.07†	(0.885)

B.S.Dzelepov, J.V.Hol'nov, Nuovo Cim. 3, Suppl. No. 1, 49 (1956).

$\gamma(Pt^{192})$ 0.29596 *10* cryst

0.30866 *6*

0.31652 *4*

0.46795 *12*

N.Ryde, B.Andersson, Proc. Phys. Soc. 68B, 1117 (1955).

Ir^{192} 77 115 74^d g.s.
(~0.3 γ)(~0.3 γ)(θ) scin
(0.468 γ)(0.316 γ)(θ)
(0.588γ)(0.613γ)(θ)
Consistent with J = 2 to 5, 2 to 5, 4(3),2,2,0 for Pt^{192} levels at 1.201, 0.920, 0.784, 0.613, 0.316, g.s.

W.H.Kelly, M.L.Wiedenbeck, Phys. Rev. 102, 1130 (1956).

(0.604 γ)(0.316 γ)(θ) J = 3, 2, 0

V.W.Shiel, L.D.Wyly, C.H.Braden, Bull. Am. Phys. Soc. 1, No. 5, 264 F7 (1956).

Ir^{192} 77 115
Resonances $Ir^{(191)}(n)$ E_n = 0.45 to 6 ev

E_o(ev)	σ_o	Γ_γ(mev)	$g\Gamma_n$(mev)
0.654 2	13800	73.5 *10*	0.25 *1*
5.36 4	24000	67 *5*	3.6 *2*

$19^h Ir^{194}$ not produced at these resonances

H.H.Landon, Phys. Rev. 100, 1414 (1955); 99, 610A (1955).

Ir^{193} 77 116
Levels $Ir^{(193)}(p,p'\gamma)$ E_p = 3.2; scin
0.143 level
γ **0.143** 4 B(E2) = 1.0 (α = 4.4)
0.368 level
γ **0.143** 4
0.3† **0.230** 6
1† **0.368** 8 B(E2) = 0.35 (α = 0.04)

R.H.Davis, A.S.Divatia, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Ir^{194} 77 117
Resonance $Ir^{(193)}(n)$ E_n = 0.45 to 6 ev

E_o(ev)	σ_o	Γ_γ(mev)	$g\Gamma_n$(mev)
1.303 5	10400	86.5 *10*	0.46 *1*

Assignment based on activation of $19^h Ir$ cryst

H.H.Landon, Phys. Rev. 100, 1414 (1955); 99, 610A (1955).

Pt 78 ms
Relative isotopic abundances

Pt^{190}	**0.0127%** 5	Pt^{195}	**33.8%** *1*
Pt^{192}	**0.78%** *1*	Pt^{196}	**25.2%** *1*
Pt^{194}	**32.9%** *1*	Pt^{198}	**7.19%** 4

No Pt^{188} (<0.0013%)
No Pt^{189}, Pt^{191} (<0.0005%)
No Pt^{193}, Pt^{197}, Pt^{199}, Pt^{200} (<0.001%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

Pt 78 "$82^d Pt$" identified as $76^d Ir^{192}$ chem, scin γ

G.W.Warren, R.W.Fink, Bull. Am. Phys. Soc. 1, No. 4, 171 E4 (1956).

Pt^{190}? 78 112 $9.6x10^{11y}$
τ **$9.6x10^{11y}$** 5 natural Pt ppl
α **3.3** 2 ppl
*Using 0.012% for abundance of Pt^{190}

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956); 9a, 701 (1954).

Pt^{191} 78 113 3.0^d
Pt^{190}(pile n,γ) chem
(0.130 γ)(0.220, 0.409 γ) scin
(~0.175 γ)(~0.175, 0.355 γ)

V.R.Potnis, C.E.Mandeville, J.S.Burlew, Phys. Rev. 101, 753 (1956).

Pt^{192} 78 114 $\sim 10^{15y}$
τ **$\sim 10^{15y}$** natural Pt ppl
α **~2.6** ppl

W.Porschen, W.Riezler, Z. Naturf, 11a, 143 (1956).

Pt^{193} 78 115 g.s.
τ **$< 500^{y*}$** Pt^{192}(pile n,γ) chem
ϵ_L a,pc L x ray
$\epsilon_K/\epsilon_L < 0.001$ from absence of K x ray pc
No γ, no particles pc,scin
*Assuming σ = 0.08

R.A.Naumann, Bull. Am. Phys. Soc. 1, No. 1, 42, K9 (1956).

Pt^{193} 78 115 4.5^d
Pt^{192}(pile n,γ) chem
γ **0.130** scin
No γ with $E_\gamma > 0.7$ (<0.03%)

V.R.Potnis, C.E.Mandeville, J.S.Burlew, Phys. Rev. 101, 753 (1956).

Pt^{195} 78 117 $\sim 6^d$
Pt^{194}(pile n,γ) chem
γ **0.031** scin
0.099
0.130
(K x ray)(K x ray, 0.099, 0.130 γ)
(0.031 γ)(0.099 γ) No (0.099 γ)(0.130 γ)

V.R.Potnis, C.E.Mandeville, J.S.Burlew, Phys. Rev. 101, 753 (1956).

Pt^{195} 78 117
Levels $Pt^{(195)}(\alpha,\alpha'\gamma)$ E_α = 4.0
0.029 level
γ **0.029** scin γ
0.126 level B(E2)~0.5*
γ **0.097** scπce

Continued

Pt^{195} 78 117

Continued

	0.210 level	B(E2) = 0.5*	
γ	**0.210**	K/L = 6	sπ ce
	0.240 level		
γ	**(0.240)**	$\alpha_K < 0.2$ E2	sπ ce

*Used B(E2) = 0.334 for 0.279 Au^{197} level

E.M.Berstein, H.W.Lewis, Phys. Rev. 100, 1345 (1955).

Level		$Pt^{(195)}(p,p'\gamma)$	E_p = 1.75
γ	**0.210** 2	$\epsilon B(E2) \sim 0.15$	sd ce_K

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat-fys. Medd. 30, No. 17 (1956).

Pt^{197} 78 119 18^h g.s.

		Pt^{196}(pile n,γ)	chem
β^-	**0.468**		scin $\beta\gamma$
	0.479	**0.670**	
$\gamma(Au^{197})$			
30†	**0.077**		scin
3.9†	**0.191**	$\alpha_K \sim 2.5$*	
1†	**0.279**		

(0.468β)(0.279γ) (0.479β)(0.191γ)
(0.670β)(0.077γ) No 0.55γ
(0.077γ)(K x ray, 0.191γ) No (0.279γ)γ
*From (x)(0.077γ)/(x)(0.191γ)

V.R.Potnis, C.E.Mandeville, J.S.Burlew, Phys. Rev. 101, 753 (1956); 99, 671A (1955).

Pt^{197} 78 119

Levels Au^{197}(n,p) E_n = 14; ppl

	Level	Γ
100†	g.s.	1.1
55†	**1.53** *15*	1.0
47†	**2.52** *15*	1.2
45†	**3.96** *15*	0.9
22†	**5.77** *15*	1.2
16†	**7.22** *15*?	1.0

R.A.Peck, Jr., Bull. Am. Phys. Soc. 1, No. 1, 40, JA8 (1956); verbal report.

Pt^{200} 78 122

τ	$<4^d$ or $>2^y$	Pt(pile n) chem

No activity observed with $\tau > 4^d$

G.W.Warren, R.W.Fink, Bull. Am. Phys. Soc. 1, No. 4, 171 E4 (1956); AECU-3165 (1956); priv. comm.

Au^{194} 79 115 39^h

β^+	1.7†	**1.21** 2		sl $\beta(0.30\gamma)$
	1.3†	**1.55** 2		sl
$\gamma(Pt^{194})$			α_K	
	26†	**0.2913** 5	0.062 7	sl ce
	100†	**0.3267** 5	0.056 6	
	20†	**0.640** *20*		scin
	9†	**0.940** *20*		
	6†	**1.120** *20*		sl ce

Continued

Au^{194} 79 115 39^h

Continued

$\gamma(Pt^{194})$			α	
6†	**1.160** *20*	0.003 *1*		
<2†	**1.230** *20*			
~2†	**1.270** *20*	0.004 *2*		
2†	**1.340** *20*	0.007 *3*		
8†	**1.470** *5*	0.010 *2*		
~1†	**~1.50**			(0.64γ)γ
6†	**1.590** *20*	0.003 *1*		sl ce
7†	**1.890** *15*	0.0014 *4*		
5†	**2.050** *15*	0.0018 *5*		
~1†	**2.150** *15*	0.013 *5*		
~0.6†	**~2.30**			scin

(ce_K 0.291γ)(0.327, 0.64, 0.94, 1.16, 1.47, 1.59γ)
(ce_K 0.327γ)(0.291, 0.64, 0.94, 1.16, 1.47, 1.59, 1.89γ)
(0.30γ)(0.30, 0.64, 0.94, 1.16, 1.47, 1.59, 1.89γ)
(0.64γ)(0.30, 0.64, 0.94, 1.16, 1.34, 1.50, 1.59γ)
(0.94γ)(0.30, 0.64, 0.94γ)
Decay scheme proposed

M.T.Thieme, E.Bleuler, Phys. Rev. 102, 195 (1956); 99, 1646A (1955).

$\gamma(Pt^{194})$	**0.290**	~130^{d}Hg source;	sl ce_K
	0.330		
	~1.5		(ce_K)γ
	~2		scin

(ce_K 0.290γ)(0.330, ~1.5γ) sl, scin
(ce_K 0.330γ)(0.290, ~1.5γ)

J.Brunner, H.Guhl, J.Halter, H.J.Leisi, Helv. Phys. Acta 28, 475A (1955).

Au^{195} 79 116 185^d g.s.

$\gamma(Pt^{195})$	1†	**0.031**	$Pt^{(194)}$(15-Mev d,n)	
	12†	**0.099**	2† **0.130**	scin

(0.099γ)(K x ray, 0.031γ)
(K x ray)(0.130γ) No (0.099γ)(0.130γ)

V.R.Potnis, Bull. Am. Phys. Soc. 1, No. 4, 170 E3 (1956); verbal report.

$\gamma(Pt^{195})$	**0.130**	sl ce

J.Brunner, H.Guhl, J.Halter, H.J.Leisi, Helv. Phys. Acta 28, 475A (1955).

Au^{195} 79 116 30^s

γ			$40^h Hg^{195}$ source
87*	**0.0565**	$\alpha \sim \infty$	scin; sπ, sl ce
		$L_2 : L_3 : M$ = 34 : 32 : 22	
19.9*	**0.2615**	α = 0.25 *3*	
		K : L : M = 16 : 3 : 0.85	
0.25*	**0.318**	(ce_{LM} only)	

*Relative ce intensities

R.Joly, J.Brunner, J.Halter, O.Huber, Helv. Phys. Acta 28, 403 (1955); 26 591A (1953).

$Au^{196}_{79\ 117}$ 5.6^{d} β^- 12%* Pt(9.5-Mev d) chem; sl pe,ce

			α_K	K/LM
$\gamma(Pt^{196})$				
	28†	**0.3310** 4	0.059 4	2.0
	100†	**0.3340** 4	0.042 3	1.9
$\gamma(Hg^{196})$		**(0.426)**		

$(0.331\gamma)(ce_K\ 0.354\gamma)$ $(ce_K\ 0.331\gamma)(ce\ 0.354\gamma)$
*From ratio $(ce_{LM}\ 0.426\gamma)/(ce_K\ 0.354\gamma)$ and measured α's

M.T.Thieme, E.Bleuler, Phys. Rev. 101, 1031 (1956); 99, 1646A (1955).

$\gamma(Pt^{196})$	**0.330**	Au^{197}(33-Mev p,d) chem
	0.360	scin
$\gamma(Hg^{196})$	**0.430**	

$(0.330\gamma)(0.360\gamma)$
$\beta(0.430\gamma)$

J.Brunner, H.Guhl, J.Halter, H.J.Leisi, Helv. Phys. Acta 28, 475A (1955).

$Au^{197}_{79\ 118}$ 7.4^{s} $Au^{197}(n,n')$, d 23^{h} Hg^{197}; sl ce

γ	402*	**0.130**	K : L : M = 30.5 : 268 : 104 L_2/L_3 = 1.3 $\alpha \sim 0.8$
	124*	**0.277**	K : L : M = 100 : 19 : 4.7 α_K = 0.29 *3*
	1.4*	**0.407**	K/LM = 2.3 $\alpha_K \geq 1.5$

$(ce\ 0.130\gamma)(0.277\gamma)$ sl,scin
$(0.277\gamma)/(0.407\gamma) \geq 500$ scin
*Relative ce intensities

R.Joly, J.Brunner, J.Halter, O.Huber, Helv. Phys. Acta 28, 403 (1955); 26, 591A (1953).

γ	**(0.279)**	E2/M1 = 0.12 *3* or 2.0 *3*	$\gamma\gamma(\theta)$
$(0.130\gamma)(0.279\gamma)(\theta)$		J = 11/2, 5/2, 3/2	

J.V.Kane, S.Frankel, Bull. Am. Phys. Soc. 1, No. 4, 171 E9 (1956).

$Au^{197}_{79\ 118}$ Levels $Au^{197}(\alpha,\alpha'\gamma)$ E_α = 3.25

	0.077 level	B(E2) = 0.18*	sπ ce
γ	**0.077**		
	0.268 level	B(E2) 0.13*	
γ	**0.191**		
	0.279 level		
γ	**0.279**	K/L = 5.5	

*Used B(E2) = 0.334 for 0.279 level

E.M.Bernstein, H.W.Lewis, Phys. Rev. 100, 1345; 99, 617A (1955).

Level $Au^{197}(p,p'\gamma)$ E_p = 2.00

γ	**0.281** *3*	$\epsilon B(E2) \sim 0.07$ sd ce_K

T.Huus, J.H.Bjerregaard, B.Elbek, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 17 (1956).

$Au^{197}_{79\ 118}$ Level $Au^{197}(\alpha,\alpha'\gamma)$ E_α = 3.0

γ	**0.277**	E2/M1 = 0.30 *7* $\alpha,\gamma(L)$

F.K.McGowan, P.H.Stelson, Phys. Rev. 103, 1133 (1956).

γ		$Au^{197}(p,p'\gamma)$		E_p = 3.8
	7.9*	**0.1913** *8*	K/L = 4.2	sπ ce
	1.9*	**0.2698** *11*	K/L = 6	
	18.3*	**0.2795** *11*	K : L : MN = 20 : 3.1 : 1	
	0.5*	**0.5477** *20*	K/L = 3.6	

*$\sigma(90°)$ for ce_K in μb/sterad

M.S.Moore, C.M.Class, F.W.Prosser,Jr., J.P. Schiffer, Bull. Am. Phys. Soc. 1, No. 2, 88, H2 (1956).

γ		$Au^{197}(n,n'\gamma)$	E_n = 0.35 to 3.9
	0.20		scin
	0.28		
	0.50		

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$Au^{198}_{79\ 119}$

	ground state	Au^{197}(pile n,γ)
J	2	M
$\lvert\mu\rvert$	**0.50** 4	

R.L.Christensen, D.R.Hamilton, A.Lemonick, P.M.Pipkin, J.B.Reynolds, H.H.Stroke, Phys. Rev. 101, 1389 (1956); 99, 613A (1955).

$Au^{198}_{79\ 119}$ 2.7^{d}

τ	**2.694**^{d} *6*	Au^{197}(pile n,γ)

C.Sastre, G.Price, Nuclear Sci. Eng. 1, 325 (1956).

τ	**2.686**^{d} *5*	differential ic

J.Tobailem, Ann. Phys. 10, 783 (1955); J.phys. radium 16, 48 (1955).

τ	**2.697**^{d} *5*	Au^{197}(slow n,γ)

K.E.Johansson, Arkiv Fysik 10, 247 (1956).

		Au^{197}(pile n,γ)
β^-	**0.960** *2*	FK linear (E_β>0.3) sl

F.T.Porter, M.S.Freedman, T.B.Novey, F. Wagner,Jr., Phys. Rev. 103, 921 (1956).

$Au^{198}_{79\ 119}$ 2.7^{d} $\gamma(Hg^{198})$ **0.41176** *19* $\alpha_K = 0.025\ 5$ EA, $\alpha_L = 0.012\ 2$ ce/β^{*}
$L_1 : L_2 : L_3 = 19 \pm 3 : 22 \pm 3 : 10$
*Total β's found from β background count at ce energy and theory of allowed β shape

D.R.Connors, W.C.Miller, B.Waldman, Phys. Rev. 102, 1584 (1956); 100, 1237A (1955).

$\gamma(Hg^{198})$ **(0.411)** $L_1L_2/L_3 = 5.9$ s
$K : L : M : N = 100 : 36 : 10 : 2.7$

R.D.Birkhoff, W.W.Smith, H.H.Hubell, Jr., J.S.Cheka, Rev. Sci. Instr. 26, 959 (1955).

$\gamma(Hg^{198})$

100†	**(0.411)**	sπ Cp
1.11†	**(0.676)**	
0.28†	**(1.089)**	

B.S.Dželepov, J.V.Hol'nov, Nuovo Cim. 3, Suppl. No.1, 49 (1956).

$Au^{198}_{79\ 119}$ Capture γ's $Au^{197}(n,\gamma)$ cryst

0.261		**0.328**	
0.271		**0.343**	double
0.276		**0.350**	
0.291	double	**0.354**	
0.308		**0.370**	double
0.311		**0.381**	
0.316		**0.439**	

Study covered $E_\gamma = 0.260$ to 0.440

D.Rose, B.Hamermesh, Bull. Am. Phys. Soc. 1, No. 4, 189 K13 (1956); verbal report.

Capture γ Au^{197}(th n,γ)
0.248 *13* scin Cp
Study covered $E_\gamma = 0.1$ to 2.5

M.Reier, M.H.Shamos, Phys. Rev. 100, 1302 (1955); 95, 636A (1954).

Resonance Au^{197}(n)

E_o(ev)	Γ_n(mev)	Γ_γ(mev)
61	86 *24*	170 *80*

Assumed g = 1/2

J.S.Levin, D.J.Hughes, Phys. Rev. 101, 1328 (1956).

$Au^{199}_{79\ 120}$ ground state $Pt^{(198)}$(pile n,$\gamma\beta$)

J	**3/2**	M
$\lvert\mu\rvert$	**0.24** *2*	

R.L.Christensen, D.R.Hamilton, A.Lemonick, F.M.Pipkin, J.B.Reynolds, H.H.Stroke, Phys. Rev. 101, 1389 (1956); 99, 613A (1955).

$Au^{199}_{79\ 120}$ 3.1^{d} τ **3.148**^{d} *10* $Pt^{(198)}$(n,$\gamma\beta$) chem

R.E.Bell, R.L.Graham, L.Yaffe, Can. J. Phys. 33, 457.

Hg_{80} Resonances Hg(n) chopper

E_o(ev)	Isotope	E_o(ev)	Isotope
23	199		
34	200	**128**	
43	202	**177**	200
73	200?	**206**	
90	199?	**311**	199?

Assignments by use of enriched isotopes

R.R.Palmer, L.M.Bollinger, Phys. Rev. 102, 228 (1956).

$Hg^{192}_{80\ 112}$ 5.7^{h} τ **6.3**^{h} Bi^{209}(480-Mev p) chem

A.P.Vinogradov, I.P.Alimarin, V.I. Baranov, A.K.Lavrukhina, T.V.Baranova, F.I.Pavlotskaya, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 132 July (1955); Consultants Bureau Trans. p. 85.

$Hg^{193}_{80\ 113}$ 12^{h} τ **11**^{h} Bi^{209}(480-Mev p) chem

A.P.Vinogradov, I.P.Alimarin, V.I.Baranov, A.K.Lavrukhina, T.V.Baranova, F.I. Pavlotskaya, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p.132 July (1955); Consultants Bureau Trans. p. 85.

$Hg^{193}_{80\ 113}$ $12^{h} + 4^{h}$ $\gamma(Au^{193})$

(0.032)	**0.360**	sπ,sl ce	
(0.038)	**0.364**		
0.157	**0.3812**	**0.920**	
(0.186)	**0.382**	**1.120**	
(0.218)	**0.394**	**1.170**	
0.220	**0.407**	**1.240**	
(0.258)	**0.499**	**1.320**	
(0.291)	**0.534**	**1.490**	
0.300	**0.571**	**1.630**	
0.345	**0.860**		

(0.218 γ)(~0.40 γ) (0.038 γ)(0.220 γ)

J.Brunner, H.Guhl, J.Halter, H.J.Leisi, Helv. Phys. Acta 28, 475A (1955).

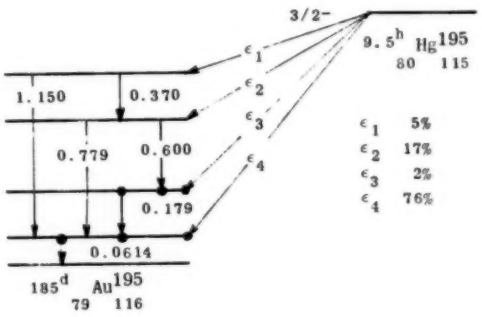
$Hg^{194}_{80\ 114}$ ~130^{d} g.s. τ ~**130**^{d} Au^{197}(55-Mev p,4n) chem
No γ sl ce, scin
γ's observed assigned to $39^{h}Au$

J.Brunner, H.Guhl, J.Halter, H.J.Leisi, Helv. Phys. Acta 28, 475A (1955).

$_{80}Hg^{195}_{115}$ $_{9.5^h}$ g.s.

τ		9.5^h 5	Au^{197}(27-Mev d,4n) chem
$\gamma(Au^{195})$	**0.0614**	L/M = 3.5	sπ,sl ce
		$L_1 : L_2 : L_3$ = 1.1 : 1 : 1	
		$\alpha \sim \infty$	
	0.179	α_K = 0.85 *15*	
4.5+	**0.390** *20*		
31+	**0.600**	$\alpha_K \sim 0.02$	
	0.779	α_K = 0.013	K/LM = 4.5
	0.930 *50*		
22+	**1.150**		

$(ce_L\ 0.061\gamma)$(K x ray, 0.179, 0.60, 0.779, 1.150γ)
$(ce_K\ 0.179\gamma)$(K x ray, 0.390, 0.60, 0.930γ)

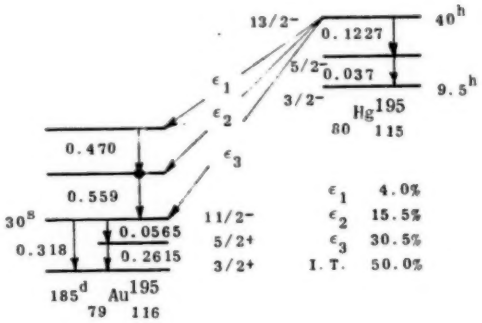


R. Joly, J. Brunner, J. Halter, O. Huber, Helv. Phys. Acta 28, 403 (1955); 26, 591A (1953); 27, 512A, 572 (1954).

$_{80}Hg^{195}_{115}$ $_{40^h}$

τ		40.0^h 5	Au^{197}(27-Mev d,4n) chem
$\gamma(Hg^{195})$	**0.037**	$L_1/L_2 \sim 10$	sπ,sl ce
		L : M : N = 60 : 20 : 11	
		$\alpha \sim \infty$	
	0.1227	$L_1 : L_2 : L_3$ = 10 : 3 : 19	
		K : L : MN = 11 : 50 : 23	
		$\alpha \geq 24$	
			scin,sl ce
$\gamma(Au^{195})$			
34+	**0.470** 5		
229+	**0.559**	K : L : M = 50 : 9.3 : 2.3	
14+	∼**1.03**		scin

$(ce_K\ 0.559\gamma)$(K x ray, 0.470γ)



R. Joly, J. Brunner, J. Halter, O. Huber, Helv. Phys. Acta 28, 403 (1955); 26, 591A (1953); 27, 512A, 572 (1954).

$_{80}Hg^{195}_{115}$ $_{40^h + 9.5^h}$

$\gamma(Au^{195})$	**0.172**	sπ,sl ce
	0.2005	**0.810**
	0.207	**0.920**
	0.368	**0.955**
	0.388	**1.010**
	0.439	**1.120**
	0.525	**1.180**
	0.584	**1.255**

$(0.388\gamma)(0.368\gamma)(0.207\gamma)$ $(0.179\gamma)(0.920\gamma)$
$(ce\ 0.262\gamma)/(ce\ 0.2005\gamma) \sim 100$
Only new γ's are listed; source: $40^h + 9.5^h$ Hg

J. Brunner, H. Guhl, J. Halter, H. J. Leisi, Helv. Phys. Acta 28, 475A (1955).

$_{80}Hg^{197}_{117}$ $_{65^h}$ g.s.

$\gamma(Au^{197})$			Au^{197}(27-Mev d,2n) chem
1060*	**0.0776**	$\alpha \sim 2.3$	sπ,sl ce
		$L_1 : L_2 : L_3$ = 100 : 46 : 34	
		L : M : N = 831 : 176 : 53	
8.62*	**0.1918**	α_K = 0.90 *10*	
		K : L : M = 7.2 : 1.1 : 0.34	

(ce 0.077γ)(K x ray, ce 0.191γ, 0.191γ)
*Relative ce intensities

R. Joly, J. Brunner, J. Halter, O. Huber, Helv. Phys. Acta 28, 403 (1955); 26, 591A (1953).

$_{80}Hg^{197}_{117}$ $_{23^h}$

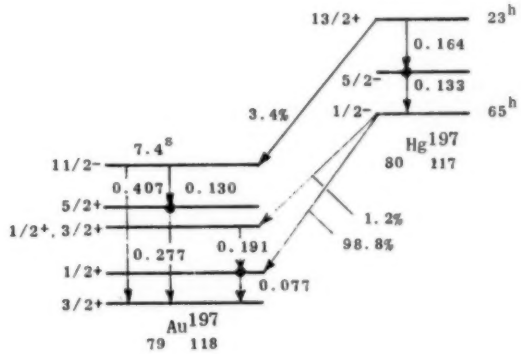
γ	**(0.133)**	E2 = 100%	$ce_K\gamma(\theta)$
	(0.164)	E5/M4 ≤ 0.01	

$(ce_L\ 0.164\gamma)(ce_L\ 0.133\gamma)(\theta)$
$(ce_K\ 0.164\gamma)(0.133\gamma)(\theta)$* J = 13/2, 5/2, 1/2
*Magnetic attenuation of correlation coefficients due to electron rearrangement shown

F. Gimmi, E. Heer, P. Scherrer, Helv. Phys. Acta, 29, 147 (1956); 28, 470A (1955).

$(ce_K\ 0.164\gamma)(ce_K\ 0.133\gamma)(\theta)$ studied scin
Attenuation of angular correlation coefficients attributed to Al source-backing

E. Breitenberger, Proc. Phys. Soc. 69A, 566 (1956).



R. Joly, J. Brunner, J. Halter, O. Huber, Helv. Phys. Acta 28, 403 (1955); 26, 591A (1953).

$Hg^{198}_{80\ 118}$

Level	$Hg^{198}(p,p'\gamma)$	$E_p = 4.5$; scin
γ	**(0.411)** $\tau = 20^{\mu\mu s}$	($\alpha = 0.04$)

R. Barloutaud, T. Grjebine, M. Riou, Compt. rend. 242, 1284 (1956).

Level	$Hg^{(198)}(p,p'\gamma)$	$E_p = 3.2$; scin
γ	**(0.411)** $\tau = 60^{\mu\mu s}$	($\alpha = 0.04$)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

$Hg^{199}_{80\ 119}$ 44^m

	0.159 level	$Hg^{(199)}$(pile n,n')
|q|	**0.70** $^{*+40}_{-15}$	$HgCl_2$ $\gamma\gamma(\theta)$
γ	**(0.159)** E2 = 100%	liquid Hg
	(0.368) E5/M4 ~ 0.008	$\gamma\gamma(\theta)$

*Using $eq(\partial^2V/\partial z^2)/h = 708$ Mc/sec for Hg^{201} (1) and $q(Hg^{201}) = 0.45$ (2)

R. V. Pound, G. K. Wertheim, Phys. Rev. 102, 396 (1956). (1) H. G. Dehmelt et al., Phys. Rev. 93, 480 (1954). (2) K. Murakawa, Phys. Rev. 98, 1285 (1955).

$Hg^{199}_{80\ 119}$

Levels	$Hg^{199}(p,p'\gamma)$	$E_p = 4.5$; scin
γ	**(0.159)**	B(E2) = 0.32 ($\alpha = 0.65$)
	(0.209)	B(E2) = 0.12 ($\alpha = 0.70$)

R. Barloutaud, T. Grjebine, M. Riou, Compt. rend. 242, 1284 (1956).

Levels	$Hg^{(199)}(p,p'\gamma)$	$E_p = 3.2$; scin
γ	**0.159** *4*	B(E2) = 0.17 ($\alpha = 1.0$)
	0.209 *5*	B(E2) = 0.06 ($\alpha = 0.7$)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Levels	$Hg^{(199)}(n,n'\gamma)44^mHg^{199}$	
	0.61	E_n = 0.5 to 2
	0.98	
	1.28	
	1.84	

These levels feed IT state

C. P. Swann, F. R. Metzger, Phys. Rev. 100, 1329 (1955).

Resonance	$Hg^{(198)}$(n)		chopper
$\sigma_o(10^3 b)$	E_o(ev)	Γ_n(mev)	Γ_γ(mev)
4.3 *10*	**23.3** *2*	5.8 *5*	145 *20*

J. S. Levin, D. J. Hughes, Phys. Rev. 101, 1328 (1956); 95, 645A (1954).

$Hg^{200}_{80\ 120}$

Level	$Hg^{200}(p,p'\gamma)$	$E_p = 4$; scin
γ	**0.368** $\tau = 59^{\mu\mu s}$	($\alpha = 0.06$)

R. Barloutaud, T. Grjebine, M. Riou, Compt. rend. 242, 1284 (1956); Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Level	$Hg^{(200)}(p,p'\gamma)$	$E_p = 3.2$; scin
γ	**0.375** *7* $\tau = 83^{\mu\mu s}$	($\alpha = 0.05$)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

Resonance	$Hg^{(199)}$(n)		chopper
$\sigma_o(10^3 b)$	E_o(ev)	$g\Gamma_n$(mev)	Γ(mev)
8.4 *14*	**34.0** *3*	39 *3*	360 *40*

J. S. Levin, D. J. Hughes, Phys. Rev. 101, 1328 (1956).

Capture γ's	$Hg^{(199)}$(th n,γ)		sπ Cp
20†	**0.37** *1*	> 3† **3.14** *3*	
~3†	**0.58** *2*	> 3† **3.25** *3*	
6†	**0.68** *1.5*	> 0.5† **3.50** *5*	
~2†	**0.83** *2*	> 0.5† **3.60** *5*	
~7†	**0.90** *3*	> 1† **3.80** *5*	
~3†	**1.01** *2*	> 1† **4.12** *5*	
~2†	**1.10** *2*	3.5† ~**4.59** *5*	
> 6†	**1.22** *1.5*	6† **4.69** *5*	
> 7†	**1.29** *1*	10† **4.82** *3*	
	1.41 *2*	3† **4.94** *5*	
	~**1.49** *2*	6† **5.05** *3*	
> 4†	**1.59** *2*	1.4† ~**5.28** *5*	
	~**1.62** *2*	4.5† **5.44** *3*	
> 13†	**1.73** *1*	6.7† **5.67** *3*	
	1.85 *2*	2† ~**5.88** *5*	
> 6†	**2.02** *1.5*	10† **5.99** *3*	
	2.10 *3*	2.4† **6.31** *5*	
> 4†	**2.29** *3*	4.5† **6.44** *3*	
	2.40 *3*	0.03† **6.95** *5*	
> 3†	**2.64** *3*	0.03† ~**7.08** *5*	
> 1†	**2.89** *3*	0.1† **7.66** *3*	

†Photons/100 Hg captures

Levels proposed at 0.37, 0.95, 1.10, 1.59, 1.73, 2.02, 2.10, 2.40, 2.59, 2.75, 3.00, 3.12, 3.25, 3.34, 3.44, 3.91 Level scheme implies B_n = 8.03 *3*

B. P. Adyasevich, B. D. Groshev, A. M. Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

$Hg^{202}_{80\ 122}$

Level	$Hg^{202}(p,p'\gamma)$	$E_p = 4$; scin
γ	**(0.439)** $\tau = 31^{\mu\mu s}$	($\alpha = 0.03$)

R. Barloutaud, T. Grjebine, M. Riou, Compt. rend. 242, 1284 (1956); Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Level	$Hg^{(202)}(p,p'\gamma)$	$E_p = 3.2$; scin
γ	**(0.439)** $\tau = 45^{\mu\mu s}$	($\alpha = 0.03$)

R. H. Davis, A. S. Divatia, R. D. Moffat, D. A. Lind, Phys. Rev. 100, 1266A (1955); verbal report.

$Hg^{203}_{80\ 123}$ 47^d

β^- 100%	**0.195** 2	Hg^{202}(pile n,γ); sd	
$\gamma(Tl^{203})$	**0.2783** 5	$\alpha_K = 0.13$ 1	sd ce
		K/LM = 2.75	

No 0.473β (< 0.03%)

J.L.Wolfson, Can. J. Phys. 34, 256 (1956).

$\gamma(Tl^{203})$		$Hg^{(202)}$(pile n,γ) ms	
	(0.279)	$\alpha_K = 0.159$ 4	sd ce/β
		$\alpha_{L1} = 0.0247$ 3*	
		$\alpha_{L2} = 0.0160$ 2*	
		$\alpha_{L3} = 0.0084$ 2*	

*Excluding systematic error of 40

C.Nordling, K.Siegbahn, E.Sokolowski, A.H. Wapstra, Nuclear Phys. 1, 326 (1956).

$\gamma(Tl^{203})$	**(0.279)**	$\alpha_K = 0.15$ 1	sl ce,cp
		K/LM = 3.2	

Z.O'Friel, A.H.Weber, Phys. Rev. 101, 1076 (1956).

$Hg^{204}_{80\ 124}$

Level		Hg^{204}(p,p'γ)	$E_p = 4$; scin
γ	**0.43** 1	$\tau \sim 73^{\mu\mu s}$	($\alpha = 0.03$)

P.Barloutaud, T.Grjebine, M.Riou, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$Hg^{206}_{80\ 126}$

τ	$< 10^h$ or $> 2^y$	Hg^{204}(pile n) chem	

No activity observed with $\tau > 10^h$

R.W.Fink, G.W.Warren, B.L.Robinson, R.R. Edwards, Bull. Am. Phys. Soc. 1, No. 4, 171 E5 (1956); AECU-3165 (1956).

$Tl\ ?_{81}$

γ		Tl(γ,?γ)	$E_\gamma \leq 22$; scin
	0.410 15	$\gamma\gamma$ delay = $65^{\mu s}$ 5	
	0.485 20	$\gamma\gamma$ delay = $530^{\mu s}$ 50	
		$\alpha_K \sim 0.25$	x/γ
	0.706 20	$\gamma\gamma$ delay = $65^{\mu s}$ 5	

S.H.Vegors, Jr., P.Axel, Phys. Rev. 101, 1067 (1956); 100, 1238A (1955).

Tl_{81}

γ		Tl(n,n'γ)	$E_n = 0.35$ to 3.9
	0.20	**0.44**	scin
	0.28	**0.62**	
	0.40	**0.70**	

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956).

$Tl^{195}_{81\ 114}$ 1.2^h

τ	**1.2**^{h} 1	Hg^{196}(20-Mev d,3n) chem	

p $9.5^h Hg^{195}$ chem; not p $40^h Hg^{195}$ chem (< 20%)

J.D.Knight, E.W.Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

$Tl^{197}_{81\ 116}$ 2.8^h g.s.

τ	**2.8**^{h} 2	Au^{197}(39-Mev α,4n) chem	
$\gamma(Hg^{197})$	**0.1526** 5		scin ce

p $65^h Hg^{197}$ chem; not p $23^h Hg^{197}$ (< 5%) chem

J.D.Knight, E.W.Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

$Tl^{198}_{81\ 117}$ 5.3^h g.s.

$\gamma(Hg^{198})$		Au^{197}(34-Mev α,3n) chem
0.194		scin ce
0.2267		
0.283		
(0.411)		
0.675		
~**1.075**		scin
~**1.23**		
~**1.44**		

Unassigned ce: 0.132, 0.512, 0.715, 0.924

J.D.Knight, E.W.Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

$Tl^{198}_{81\ 117}$ 1.9^h

τ		**1.90**^{h}	Au^{197}(37-Mev α,3n) chem
ϵ	~60%		from 0.635γ/0.282γ scin
$\gamma(Hg^{198})$			
	10†	**(0.411)**	scin
	~10†	**(0.586)**	
	~13†	**(0.635)**	

(0.635 γ)(0.586 γ)(0.411γ) (K x ray)(~0.61γ)

P.S.Fisher, V.Knapp, Proc. Phys. Soc. 69A, 541 (1956).

$\gamma(Tl^{198})$			Au^{197}(34-Mev α,3n) chem
100*	**(0.2607)**		scin ce
	(0.2824)		
$\gamma(Hg^{198})$	**0.194** ?	K/LM	
~2*	**0.442**	~8	
~3*	**0.586**	~8	
~6*	**0.635**	~6	

0.635γ/0.282γ ~1.1; 0.586γ/0.282γ ~1.1 scin

Unassigned ce: 0.221, 0.292, 0.308, 0.339, 0.415 0.436, 0.458, 0.467, 0.585, 0.642, 0.753, 0.816

*Relative ce_K intensities

J.D.Knight, E.W.Baker, Phys. Rev. 100, 1334; 99, 1646A (1955).

$Tl^{202}_{81\ 121}$ 12^d

$\gamma(Hg^{202})$		Hg(26-Mev d) chem	
70†	**0.4406** 4	K/LM = 2.7	sd ce
		$\alpha_K \sim 0.043$	*ce_K/e_{AK}, x/γ
x 100†	**K x ray**		scin

$e_{AK}/(ce_K\ 0.441\gamma) = 1.92$

$[(x_L/x_K)Tl^{202}]/[(x_L/x_K)Hg^{203}] = 0.63$ 8 pc

$\therefore \epsilon_L/\epsilon_K = 0.90$ 27 if $\alpha_K/\alpha_L = 0.30$ for Hg^{203}

Used $\omega_K = 0.945$

Estimated decay energy will be revised*

P.Kramer, H.C.Hamers, G.Meijer, Physica 22, 208 (1956); *priv. comm.

$Tl^{203}_{81\ 122}$

Level — $Tl^{203}(\alpha,\alpha'\gamma)$ — $E_\alpha = 3.0$
γ **(0.279)** E2/M1 = 2.25 25 $\alpha,\gamma(\theta)$

F.K.McGowan, P.H.Stelson, Phys. Rev. 103, 1133 (1956).

Levels — $Tl^{(203)}(p,p'\gamma)$ — $E_p = 4$ scin
γ **(0.279)** $\epsilon B(E2) = 0.07$
0.680

P.Barloutaud, T.Grjebine, M.Riou, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$Tl^{204}_{81\ 123}$ 4.1^y

τ **4.26^y** *6* differential ic
$Tl^{(203)}$(pile n,γ) chem

J.Tobailem, J.Robert, J. phys. radium 16, 340 (1955); Ann. Phys. 10, 783 (1955).

Previous result, $\tau = 2.71^y$, retracted.
If $\tau(Tl^{204}) = 4.07^y$, decay curve has component due to unidentified nucleus with $\tau = 1.22^y$

E.E.Lockett, R.H.Thomas, Nucleonics, No. 11, 127 (1956); 11, No. 3, 14 (1953).

E_ϵ **0.376** (K x ray)(continuum γ)
From γ continuum endpoint = 0.293 *20*

R.G.Jung, M.L.Pool, Bull. Am. Phys. Soc. 1, No. 4, 172 E11 (1956).

$Tl^{205}_{81\ 124}$

γ — $Tl^{(205)}(p,p'\gamma)$ — $E_p = 4$ scin
0.205 $\epsilon B(E2) = 0.07$
~4† **0.410**
100† **0.615**

P.Barloutaud, T.Grjebine, M.Riou, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

$Tl^{208}_{81\ 127}$ 3.1^m

β^- **1.25** 1.9^y Th^{228} source; a
1.52
~22% **1.79**
~1.5% **2.38** *8*
No 5.0β (<1%) scin

F.Demichelis, R.A.Ricci, G.Trivero, Nuovo Cim. 3, 377 (1956).

$Tl^{208}_{81\ 127}$ 3.1^m

$\gamma(Pb^{208})$ **0.58332** *13* sd ce_K
$H\rho(M) = 2891.9$ *5*
Based on $H\rho$(Th C'' L) = 2607.17

G.Bäckström, Arkiv Fysik 10, 393 (1956).

$\gamma(Pb^{208})$ **(0.511)** E2/M1 = 0.04 $\gamma\gamma(\theta,\perp)$
(0.583) E2
(0.860) E2/M1 ~ 0.0008
(2.615) E3
(0.511 γ)(0.583 γ)(θ,$\perp$) J = 5$^-$, 5$^-$, 3$^-$
(0.583 γ)(2.615 γ)(θ,$\perp$) J = 5$^-$, 3$^-$, 0$^+$
(0.860 γ)(2.615 γ)(θ,$\perp$) J = 4$^-$, 3$^-$, 0$^+$

G.T.Wood, P.S.Jastram, Phys. Rev. 100, 1237A (1955).

$Tl^{209}_{81\ 128}$ 2.2^m

$\gamma(Pb^{209})$ **0.120** $10^d Ac^{225}$ source; scin $\beta\gamma$
0.450
1.560
β(K x ray, 0.120γ) delay = 3.1$^{m\mu s}$ *10*
(>1.0β)(0.450γ) delayed
$\beta(E_\gamma > 0.50)$ delayed
(0.120 γ)(0.450, 1.560γ) delay < 1.5$^{m\mu s}$
No β to 2.01 level (<10% from γ intensities)

D.Strominger, F.S.Stephens, Jr., J.O.Rasmussen, Phys. Rev. 103, 748 (1956).

$Tl^{210}_{81\ 129}$ 1.3^m

collected from Rn^{222}
β^- **1.96** *10* scin $\beta\gamma$
$\gamma(Pb^{210})$ **0.297** *8*
0.783 *10*
2.36 *5*
(0.297 γ)(0.783, 2.36γ)

Th. Mayer-Kuckuk, Z. Naturf. 11a, 627 (1956).

Pb 82

Relative isotopic abundances ms
Pb^{204} **1.40%** *2* Pb^{207} **21.7%** *1*
Pb^{206} **25.2%** *1* Pb^{208} **51.7%** *2*
No Pb^{202} (<0.003%) No Pb^{203} (<4 x 10^{-4}%)
No Pb^{205} (<0.001%) No Pb^{209} (<5 x 10^{-5}%)
No Pb^{210}, Pb^{211}, Pb^{212} (<7 x 10^{-6}%)
No Pb^{213} (<5 x 10^{-6}%)

F.A.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

Resonance peak — Pb(n) **46** kev — E_n = 2 to 80 kev, $l_n = 0$ — Li(p,n)
Graph given showing 9 more weak peaks

H.W.Newson, J.H.Gibbons, H.Marshak, R.M. Williamson, R.A.Mobley, A.L.Toller, R.Block, Phys. Rev. 102, 1580 (1956).

$Pb^{202}_{82\ 120}$ 3.5^{h}

$(0.961\gamma)(0.422\gamma)$ delay $< 1^{m\mu s}$
$\gamma(0.961\gamma)$ delay $< 1^{m\mu s}$

G.K.Wertheim, R.V.Pound, Phys. Rev. 102, 185 (1956); priv. comm.

$Pb^{203}_{82\ 121}$ 52^{h}

$\gamma(Tl^{203})$		$12^{h}Bi^{203}$ source
(0.279)	$\alpha_K = 0.14$	xx/x

R.E.Bell, H.M.Skarsgard, Can. J. Phys. 34, 745 (1956).

$Pb^{204}_{82\ 122}$ 68^{m}

	1.27 level		Tl(22-Mev d)
μ	+0.22 2		$\gamma\gamma(\theta,H)$
	$Pb^{204}(n,n')$;	$12^{h}Bi^{204}$ chem	
γ	**0.374**	E2 = 100%	scin, $\gamma\gamma(\theta)$
	0.890	E2 = 100%	
	0.905	E5 = 100%	

$(0.905\gamma)(0.374, 0.890\gamma)$ delay = $0.26^{\mu s}$ 2
$(0.374\gamma)(0.890\gamma)(\theta)$ J = 4, 2, 0
$(0.905\gamma)(0.374\gamma)(\theta)$ } J = 9, 4, 2, 0
$(0.905\gamma)(0.890\gamma)(\theta)$

J.R.Huizenga, V.E.Krohn, S.Raboy, Phys. Rev. 102, 1063 (1956); Bull. Am. Phys. Soc. 1, No. 1, 43 K10 (1956); Phys. Rev. 95, 1354 608A (1954); 97, 1017 (1955); 98,231A (1955).

γ	**0.371**	M3/E2 = 0.0025	$\gamma\gamma(\theta)$
	0.895	E2 = 100%	scin
	0.910		

$(0.371\gamma)(0.895\gamma)(\theta)$ J = 4, 2, 0
Time-dependent attenuation function for $0.26^{\mu s}$ level differs from theoretical value

G.K.Wertheim, R.V.Pound, Phys. Rev. 102, 185 (1956).

$Pb^{205}_{82\ 123}$ $\sim 5 \times 10^{7y}$

$Pb^{(206)}$(21-Mev d,3n)Bi^{205} chem

τ_{ϵ_L} $\sim 5 \times 10^{7y}$

From (L x ray from Pb^{205})/(L x ray from Pb^{203}) assuming $\sigma[Pb^{206}(d,3n)] = \sigma[Pb^{204}(d,3n)]$

J.R.Huizenga, J.Wing, Phys. Rev. 102, 926 (1956).

τ_{ϵ_K} $< 2^{s}$ or $> 10^{10y}$ Pb^{204}(pile n,γ) chem
No Tl K x rays were observed scin

R.H.Herber, T.T.Sugihara, C.D.Coryell, W.E. Bennett, J.R.Huizenga, Phys. Rev. 103, 955 (1956).

$Pb^{206}_{82\ 124}$

Level	$Pb^{(206)}(p,p'\gamma)$		$E_p = 4.6$
γ	**(0.803)**	$\tau = 7.5^{\mu\mu s}$	scin

P.Barloutaud, T.Grjebine, M.Riou, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956); verbal report.

Levels	$Pb^{206}(n,n')$		$E_n = 2.45$
$\sigma(90°)$	Level		pulsed n's
51 *6*	**0.84** *4*		
44 *6*	**1.44** *3*		
32 *5*	**1.74** *2*	σ units: mb/sterad	

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

γ	$Pb^{206}(n,n'\gamma)$		$E_n = 2.56$
$\sigma(95°)$	E_γ		
46 *8*	**0.533** *5*		scin
22 *7*	**0.661** *10*		
112 *12*	**0.802** *8*		
10 *5*	**1.43** *3*		
16 *7*	**1.73** *3*	σ units: mb/sterad	

R.B.Day, Phys. Rev. 102, 767 (1956).

γ	$Pb^{206}(n,n'\gamma)$		E_n = 0.35 to 3.9
$\sigma(90°)$	E_γ	Thresh	
30	**0.535** *5*	1.38 *3*	scin
17	**0.662** *5*	1.475 *30*	
50	**0.803**	0.78 *3*	
	1.36 *5*	2.250 *15*	
	1.45 *5*	1.55 *10*	
10	**1.68** *3*	1.75 *10*	

σ units: mb/sterad at $E_n = 2.59$

R.B.Day, A.E.Johnsrud, D.A.Lind, Bull. Am. Phys. Soc. 1, No. 1, 56, R9 (1956); verbal report.

$Pb^{(207)}(\gamma,n\gamma)$ $E_\gamma \leq 22$; scin
$\gamma(0.343, 0.516, 0.537, 0.803, 0.880\gamma)$ delay = $132^{\mu s}$ *10*
Threshold = 10.38 *45*

S.H.Vegors,Jr., P.Axel, Phys. Rev. 101,1067 (1956).

$Pb^{207}_{82\ 125}$ 0.82^{s}

τ	0.948^{s} *14*	Pb(pulsed n's)

N.Veeraraghavan, Proc. Indian Acad. Sci. 43A, 319 (1956).

τ	0.83^{s}	Pb(pulsed 14-Mev n's)

P.A.Iampol'skii, O.I.Leipunski, M.I.Gen, A.M. Tikhomirov, Izvest. Akad. Nauk. Ser. Fiz. SSSR 19, 338 (Columbia Technical Trans. p. 312) 1955.

$Pb^{207}_{82\ 125}$ Levels $Pb^{207}(n,n'\gamma)$ $E_n = 2.56$

	$\sigma(95°)$	Level	
γ	77 *14*	**0.570** *10*	scin
	51 *8*	**0.888** *10*	σ units: mb/sterad

R.B.Day, Phys. Rev. 102, 767 (1956).

Capture γ $Pb^{(206)}$(th n, γ) sπ Cp
6.74 *3*

B.P.Adyasevich, B.D.Groshev, A.M.Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

$Pb^{208}_{82\ 126}$ Capture γ $Pb^{(207)}$(th n, γ) sπ Cp
7.40 *3*
No other γ (< 10% of 7.40 γ)

B.P.Adyasevich, B.D.Groshev, A.M.Demidov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 270 July (1955); Consultants Bureau Trans. p. 195.

$Pb^{210}_{82\ 128}$ 22^{y} source chemically pure; pc
No γ with $0.025 < E_\gamma < 0.032$ (< 0.2% of 0.047γ)
Peak in this region was observed only with Pb^{210} + Bi^{210} source and appears to be due to Bi^{210} bremsstrahlung.

R.W.Fink, G.W.Warren, R.R.Edwards, P.E.Damon, Phys. Rev. 103, 651 (1956).

$Pb^{212}_{82\ 130}$ 11^{h} τ **10.643**^{h} *12* source addition

J.Tobailem, J.Robert, J. phys. radium 16, 115 (1955); Ann. Phys. 10, 783 (1955).

τ **10.6**^{h} *3* differential ic

B.S.Dzhelepov, O.E.Kraft, Vestnik-Leningrad Univ., Ser. Mat. Fiz. Khim. No. 8, 97 (1955); Chem. Abstr. 50, No. 12675e (1956).

$\gamma(Bi^{212})$ **(0.238)** iron free sd ce

$H\rho$(F) = 1388.45 *10*	$E(ce_K)$ = 0.148083 *18*
$H\rho$(I) = 1753.91 *14*	$E(ce_{L_1})$ = 0.222217 *31*
$H\rho(I_a)$ = 1757.07 *14*	$E(ce_{L_2})$ = 0.222897 *31*
$H\rho$(J) = 1811.11 *15*	$E(ce_{M_1})$ = 0.234612 *33*

$H\rho$ based on x ray energy data*

K.Siegbahn, K.Edvarson, Nuclear Phys. 1, 137 (1956); *Y.Cauchois, H.Hulubei, Table de Constantes et Donnees Numeriques, Herman, Paris 1947.

$Pb^{212}_{82\ 130}$ 11^{h} $\gamma(Bi^{212})$

	L_1 :	L_2 :	L_3 :	M_1 :	M_2
(0.238)	1000:	108 :	8 :	240 :	28

s ce

V.M.Kel'man, V.A.Romanov, R.Ja.Metshvapichichirli Doklady Akad. Nauk. SSSR 103, 577 (1955).

$\gamma(Bi^{212})$ **(0.238)** K/L = 5.9 *4* sd ce
L_1/L_2 = 10.0 *7*

E.Sokolowski, K.Edvarson, K.Siegbahn, Nuclear Phys. 1, 160 (1956).

$\gamma(Bi^{212})$ **(0.238)** K/L = 5.5 *2* sd ce
(ce_K 0.238 γ)/100 β's = 30 ±2

O.B.Nielsen, Kgl. Danske Videnskab. Selskab Mat.-fys. Medd. 30, No. 11 (1955).

$Pb^{214}_{82\ 132}$ 27^{m} β^- 6 ±2% **1.03** *6* sl
Source chemically freed from $20^{m}Bi^{214}$

H.Daniel, Z.Naturf. 11a, 759 (1956).

$Bi^{202}_{83\ 119}$ τ **30**^{m} U(480 - Mev p) chem

A.P.Vinogradov, I.P.Alimarin, V.I. Baranov, A.K.Lavrukhina, T.V.Baranova, F.I.Pavlotskaya, A.A.Bragina, Y.V. Yakovlev, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 97 July (1955); Consultants Bureau Trans. p.65.

$Bi^{203}_{83\ 120}$ 12^{h} No γ Pb^{206}(>31-Mev p,4n) chem; scin
Observed γ's assigned to $12^{h}Bi^{204}$, $52^{h}Pb^{203}$

G.K.Wertheim, R.V.Pound, Phys. Rev. 102, 185 (1956).

$Bi^{204}_{83\ 121}$ 12^{h} τ **11.6**^{h} *2* Pb^{206}(31-Mev p,3n) chem

$\gamma(Pb^{204})$	**0.371**	sd ce, scin
	0.668	**1.20**
	0.895	**1.73**
	0.981	**2.10**

(0.981 γ)(0.668, 1.20γ)
0.668, 0.981, 1.20, 1.73γ's precede 0.26$^{\mu s}$ level
0.981γ/0.910γ = 0.75 from decrease in delayed (0.9 γ)(0.9 γ) after chemical separation of Pb

G.K.Wertheim, R.V.Pound, Phys. Rev. 102, 185 (1956).

$Bi^{205}_{83\ 122}$ 14.5^{d}

τ **15**^{d} U(480 - Mev p) chem

A.P.Vinogradov, I.P.Alimarin, V.I. Baranov, A.K.Lavrukhina, T.V.Baranova, F.I.Pavlotskaya, A.A.Bragina, Y.V. Yakovlev, Conf. Acad. Sci. on Peaceful Use of Atomic Energy, Chem. Sci. p. 97 July (1955); Consultants Bureau Trans. p. 65. p. 65.

$Bi^{207}_{83\ 124}$ 8.0^{y}

$\gamma(Pb^{207})$ **0.5697** *1* sd ce_K

$H\rho(ce_K\ 0.5697\gamma) = 2838.9\ 4$

Based on $H\rho$(Th C" L) = 2607.17

G.Bäckström, Arkiv Fysik 10, 393 (1956).

$\gamma(Pb^{207})$ **0.5697** *2* sd ce

P.Marmier, F.Boehm, quoted by D.E.Alburger, A.W.Sunyar, Phys. Rev. 99, 695 (1955).

$\gamma(Pb^{207})$ **0.56885** *30* sl pe

1.06343 *50*

No other γ with $E_\gamma = 1.06\ 8$ (< 10% of 1.063 γ)

A.I.Yavin, F.H.Schmidt, Phys. Rev. 100, 171 (1955).

$\gamma(0.570\gamma)$ delay = $90^{\mu\mu s}$ *30*

T.R.Gerholm, Arkiv Fysik 10, 523 (1956).

$Bi^{208?}_{83\ 125}$

γ Bi^{209}(n,2nγ) pulsed 14-Mev n's

~**2.5** n,γ delay ~2.3^{ms}; a

Assignment from comparison of yield with that of 0.83$^{S}Pb^{207}$ from Pb(14-Mev n,2n)

P.A.Iampol'skii, O.I.Leipunski, M.I.Gen, A.M. Tikhomirov, Izvest. Akad. Nauk. Ser. Fiz. SSSR 19, 338 (Columbia Technical Trans. p. 312) 1955.

$Bi^{209}_{83\ 126}$ $2x10^{17y}$

τ **2x10**^{17y} *1*

α **3.0** *2*

12 tracks found in Bi impregnated plates stored 100 to 180 days

W.Porschen, W.Riezler, Z. Naturf. 11a, 143 (1956); 7a, 634 (1952).

$Bi^{209}_{83\ 126}$

Levels Bi^{209}(n,n') $E_n = 2.45$ pulsed n's

$\sigma(90°)$	Level	
30	**0.93** *4*	
34	**1.65** *3*	σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956).

Levels Bi^{209}(n,n'γ) $E_n = 2.56$ scin

	$\sigma(95°)$	Level	
γ	34 *4*	**0.904** *9*	
	21 *2*	**1.615** *16*	σ units: mb/sterad
		2.600 *20*	(thresh at $E_n = 2.60$)

R.B.Day, Phys. Rev. 102, 767 (1956).

Levels Bi^{209}(n,n') $E_n = 4.3$; scin pulsed n's, 90°

0.9 ?

1.8

R.V.Smith, Bull. Am. Phys. Soc. 1, No. 4, 175 F2 (1956); verbal report.

γ $Bi^{209}(\gamma,\gamma)$ $E_\gamma \leq 22$; scin

0.500 *20* $\gamma\gamma$ delay = 2.70^{ms} *25*

0.930 *30* = 2.70^{ms} *25*

S.H.Vegors,Jr., P.Axel, Phys. Rev. 101, 1067 (1956); 100, 1238A (1955).

$Bi^{210}_{83\ 127}$ 5.0^{d}

τ **5.013**^{d} *5* differential ic

J.Robert, J.Tobailem, J. phys. radium 17, 440 (1956).

p 4.2$^{m}Tl^{206}$ 0.00017 2 % chem

R.W.Fink, G.W.Warren, B.L.Robinson, R.R. Edwards, Bull. Am. Phys. Soc. 1, No. 4, 171 E5 (1956).

$22^{y}Pb^{210}$ source

No γ and no L x ray pc

R.W.Fink, G.W.Warren, R.R.Edwards, P.E.Damon, Phys. Rev. 103, 651 (1956).

$e^{+}/\beta^{-} < 1.2 \times 10^{-4}$ cc

A.B.Milojević, Bull. Inst. Nuclear Sci. Boris Kidrich 6, 21 (1956).

$_{83}Bi^{210}_{127}$ Resonances $Bi^{209}(n)$ E_n = 2 to 20000 ev chopper

E_o(kev)	Γ(ev)
0.810	5.8 *3*
2.37	17 *2*
13	double

L.M.Bollinger, D.A.Dahlberg, R.R.Palmer, G.E.Thomas, Phys. Rev. 100, 126 (1955); 95, 645A (1954).

Resonance peaks	$Bi^{209}(n)$ E_o(kev)	l_n	Li(p,n) E_o(kev)	l_n
	~1			
	~3	0	34	0
	13	0	47	0
	16		70	0

J.H.Gibbons, Phys. Rev. 102, 1574 (1956).

$_{83}Bi^{212}_{129}$ 60.5^m $\gamma(Tl^{208})$ $11^h Pb^{212}$ source

113*	**(0.287)**	K/L = 5.3 sd; α(ce)
27*	**(0.327)**	
4.0*	**(0.431)**	
34*	**(0.451)**	K/L = 5
2.5*	**(0.471)**	

α(ce 0.287, 0.327, 0.431, 0.451, 0.471 γ)
*ce_K per 10^5 disintegrations

O.B. Nielsen, Kgl. Danske Videnskab. Selskab, Mat.-fys. Medd. 30, No. 11 (1955).

$\gamma(Tl^{208})$ **(0.040)** iron free sd ce
$H\rho$(A) = 534.21 *3* $E(ce_{L1})$ = 0.024510 *3*
$H\rho$(B) = 652.40 *4* $E(ce_{M1})$ = 0.036153 *4*
$H\rho$ based on x ray energy data*

K.Siegbahn, K.Edvarson, Nuclear Phys. 1, 137 (1956); *Y.Cauchois, H.Hulubei, Table de Constantes et Donnees Numeriques, Herman, Paris 1947.

$\gamma(Tl^{208})$ **(0.040)** α_{L_-} = 21 *7* scin
(6.05 α)(0.040γ)(θ) J = $1^-, 4^+, 5^+$ *
*From $\eta(\pi)$ = 0.299 *42*; E2/M1 $\leq$ 5 x 10^{-5} for 0.04γ
J(Bi^{212}) = 1^-; J(Tl^{208}) $\neq$ 6

J.W.Horton, Phys. Rev. 101, 717 (1956); 90, 388A (1953).

(6.05 α)(0.040 γ) delay > 0.1 $\mu\mu$s
No Doppler broadening observed sl $\alpha(ce_{L1})$

J.Brude, S.G.Cohen, Phys. Rev. 101, 495 (1956).

$_{83}Bi^{214}_{131}$ 20^m τ **19.9^m** *4* d $27^m Pb^{214}$ chem and $27^m Pb^{214}$ source; sl

β^-				
9%	**0.42** *15*			
23%	**1.02** *12*	9%	**1.88** *8*	
40%	**1.51** *5*	19%	**3.26** *3*	

No 2.6β

H.Daniel, R.Nierhaus, Z. Naturf. 11a, 212 (1956).

β^-					
~20%	~0.45		7%	**1.72** *9*	a
22%	**1.03** *12*		6%	**2.57** *12*	
29%	**1.45** *4*		13%	**3.18** *9*	

(1.45, 2.57β) γ No (3.18β) γ

R.A.Ricci, G.Trivero, Nuovo Cim. 2, 745 (1955).

Ra^{226} source
(E_β > 1.75)(0.61γ)(θ) J = 2^-, 2^+, 0 scin
$\eta(\pi)$ = 0.47 *3*

F.Demichelis, L.A.Radicati, Nuovo Cim. 3, 152 (1956).

$\gamma(Po^{214})$ Ra^{226} source sπ Cp

464†	**(0.6093)**	43†	**(1.5093)**
38†	**0.6524***	21†	**1.5829***
	0.6609*	7†	**1.6052***
19†	**0.7032***	29†	**(1.7283)**
70†	**(0.7687)**	252†	**(1.7644)**
17†	**0.7871***	44†	**1.7838***
17†	**0.8063***	14†	**1.7907***
13†	**0.8213***	28†	**(1.8485)**
52†	**(0.9348)**	22†	**1.8623***
206†	**(1.1204)**	19†	**1.900**
40†	**(1.1553)**	6†	**(2.0167)**
19†	**1.2071***	9†	**2.085**
88†	**(1.2383)**	23†	**(2.1170)**
26†	**(1.2813)**	100†	**(2.2042)**
72†	**(1.3782)**	7†	**2.290**
	1.3853*	4†	**2.340**
	1.3911*	41†	**(2.432)**
73†	**1.3965***		
	1.4017*		
	1.4080*		
	1.4380*		

No 1.4159 photon (<3%)
*Energies assigned assuming ce_K's were observed by Mladjenović and Slätis. Assignment accounts for spectrum between peaks

B.S.Dželepov, S.A.Šestopalova, Nuovo Cim. 3, Suppl. No. 1, 54 (1956).

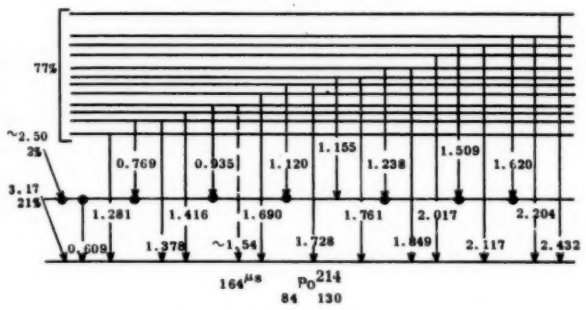
$Bi^{214}_{83\ 131}$ 20^{m}

Coincident radiation	E_γ = 0.609	0.769	0.935	1.120	1.238	1.378	1.509	1.620	1.764	2.200
0.609γ		Y	Y	Y	Y	Y	Y	Y		
E_β = 0.65		Y	Y	Y	Y	Y	Y	Y	N	Y N
0.9 < E_β < 1.5		Y	Y	Y	Y	Y	Y		Y	
1.5 < E_β < 1.7		Y	Y	Y		Y	Y			
1.7 < E_β < 1.9		Y	Y			Y				
1.9 < E_β < 2.5		Y								

Intensity of 2.5β ~ 10% of 3.17β

Y = coincidence observed scin

N = coincidence not observed



S.E. Johansson, Arkiv Fysik 9, 561 (1955).

$Po^{208,9}_{84}$ γ(?) ~70† **0.270** Bi^{209}(20-Mev p) scin

~70† **0.570**

75† **0.865**

(0.270γ)(0.570γ)

0.865γ is not crossover Σ scin

Source 14.5% Po^{209} (band spectrum measurement)

†Photons per 10^4 α's

E.H. Daggett, G.R. Grove, Phys. Rev. 99, 1 (1955); 95, 627A (1954).

$Po^{209}_{84\ 125}$

	ground state
J	1/2

S

K.L. Vander Sluis, P.M. Griffin, J. Opt. Soc. Am. 45, 1087 (1955).

$Po^{209}_{84\ 125}$ 10^{3y}

τ **10^{3}**^{y} 4 From sample with Po^{209}/Po^{208} = 0.176 2, $(Po^{209}\ \alpha)/(Po^{208}\ \alpha)$ = 0.0050 2, and $\tau(Po^{208})$ = 2.93^{y} 3

C.G. Andre, J.R. Huizenga, J.F. Mech, W.J. Ramler, E.G. Rauh, S.R. Rocklin, Phys. Rev. 101, 645 (1956).

$Po^{203}_{84\ 119}$ 42^{m}

τ **42^{m}** Bi^{209}(60-Mev p,7n)

R.E. Bell, H.M. Skarsgard, Can. J. Phys. 34, 745 (1956).

$Po^{205}_{84\ 121}$ 1.8^{h}

τ **1.8^{h}** 1 Bi^{209}(40-Mev p,5n)

R.E. Bell, H.M. Skarsgard, Can J. Phys. 34, 745 (1956).

$Po^{206}_{84\ 122}$ 9^{d}

ε/α = 95/5 $(Rn^{210}\ \alpha)/(Po^{206}\ \alpha)$ ic

F.P. Momyer, Jr., E.K. Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).

$Po^{208}_{84\ 124}$ 2.9^{y}

γ(Bi^{208}) Bi^{209}(d,3n) chem

3† **0.285** scin

6† ~**0.60** double

(K x ray) (0.285, ~0.60γ)

(0.285γ) (both 0.60γ's)

Source ~99% Po^{208} from $(Po^{208}\ \alpha)/Po^{209}\ \alpha)$

†Photons per 10^5 α's

I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.

γ(Pb^{205}) Bi^{209}(d,2n) chem

40† **0.260** α_K = 0.75 scin

γ(Bi^{209})

50† **0.910** α_K = 0.021

α(0.260γ) (K x ray)(0.910γ)

ϵ_{LM}/ϵ_K ~0.2

All ε to 0.910 level of Bi^{209} xγ/x

Source 85% Po^{209} from $(Po^{209}\alpha)/(Po^{208}\ \alpha)$

†Photons per 10^4 α's

I. Perlman, F. Asaro, F.S. Stephens, J.P. Hummel, R.C. Pilger, UCRL-2932, p 59 (1955); priv. comm.

$Po^{217}_{84\ 133}$ $<10^{s}$

τ **$<10^{s}$** $25^{m}Rn^{221}$ recoil

β⁻ <20% $(Fr^{221}\ \alpha)/(At^{217}\ \alpha)$ = 1.00 5 ic

α **6.54** 2

P.F. Momyer, Jr., E.K. Hyde, Phys. Rev. 101, 136 (1956).

$At^{211}_{85\ 126}$ 7.2^{h}

Bi^{209}(29-Mev α,2n) chem

τ **7.20^{h}** 5 ic α

γ 4† **0.06235** 50 cryst

x 100† **K x ray** cryst

ce **0.0460** 3 ? sπ ce

P.R. Gray, Phys. Rev. 101, 1306 (1956).

$Rn^{208}_{86\ 122}$ 23^m

τ **23^m** *2* Th^{232}(340-Mev p) chem
ϵ ~80% (Po^{208} α)/(Rn^{208} α) ic
α ~20% **6.14** *2* ic
p 3.8^hPo^{204} (5.37α observed)

F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).

α **6.141** *4* s

F.F.Momyer, Jr., F.Asaro, E.K.Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955).

$Rn^{209}_{86\ 123}$ 30^m

τ **30^m** *2* Th^{232}(340-Mev p) chem
ϵ 83% (At^{209} α^*)/(Rn^{209} α) ic
α 17% **6.02** *2* ic
p 5.5^hAt^{209} (5.65α observed)
*Used $\epsilon(At^{209})/\alpha(At^{209})$ = 95/5

F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1,274 (1955); Phys. Rev. 86, 805 (1952).

α **6.037** *10* s

F.F.Momyer, Jr., F.Asaro, E.K.Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955).

$Rn^{210}_{86\ 124}$ 2.7^h

τ **2.7^h** *2* Th^{232}(340-Mev p) chem
ϵ ~4% (Po^{210} α)/(Rn^{210} α) ic
α ~96% **6.02** *2* ic
p 9^dPo^{206} (5.22α observed)

F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955); Phys. Rev. 86, 805 (1952).

α **6.037** *3* s

F.F.Momyer, Jr., F.Asaro, E.K.Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955).

$Rn^{211}_{86\ 125}$ 16^h

τ **16^h** *1* Th^{232}(340-Mev p) chem
ϵ 74% ($Po^{211}$$\alpha$)/($Rn^{211}$$\alpha$ + $At^{211}$$\alpha^\$$) ic
$\gamma(At^{211})^*$ **0.030** scin
0.240 **0.97**
0.430 **1.13**
0.890 **1.34**
α 26% **5.82** *2* ic
p 7.2^hAt^{211} chem
$^\$$Used $\epsilon(At^{211})/\alpha(At^{211})$ = 60/40

F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955); Phys. Rev. 86, 805 (1952); *B.Raby, A.W.Stoner, ibid.

$Rn^{211}_{86\ 125}$ 16^h

α 2.0† **5.613** *7* Th^{232}(340-Mev p) chem;s
64.5† **5.779** *3*
32.5† **5.847** *2*
$\gamma(Po^{207})$ **0.0688**$^\$$ sπce
0.169* scin$\alpha\gamma$
0.234* scin$\alpha\gamma$
α(0.069, 0.169, 0.234γ)*

F.F.Momyer, Jr., F.Asaro, E.K.Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955); *A.W.Stoner, F. Asaro, ibid.; $A.W.Stoner, W.G.Smith, J.M. Hollander, ibid.

$Rn^{212}_{86\ 126}$ 23^m

α **6.262** *5* s

F.F.Momyer, Jr., F.Asaro, E.K.Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955).

$Rn^{220}_{86\ 134}$ 52^s

τ **51.5^s** *10* d Th^{232} chem

H.Schmied, R.W.Fink, B.L.Robinson, J. Inorg. Nucl. Chem. 1, 342 (1955).

$Rn^{220}_{86\ 134}$ 52^s

$\gamma(Po^{216})$ Rn collected from Th^{228}
~2.5† **0.542** *2* scin
Not emitted in decay of 0.16^sPo^{216} (intensity changed <10% by reversal of electric field)
†Photons per 10^4 disintegrations

L.Madansky, F.Rasetti, Phys. Rev. 102, 464 (1956).

$Rn^{221}_{86\ 135}$ 25^m

τ **25^m** *2* Th^{232}(110-Mev p) chem
$\beta/\alpha = 4 \pm 1$ ($At^{217}\alpha$)/(Po^{217} α) ic
p At^{217} and Po^{213} (7.02α, 8.34α observed)

F.F.Momyer,Jr., E.K.Hyde, Phys. Rev. 101, 136 (1956).

$Rn^{222}_{86\ 136}$ 3.8^d

τ **3.8229^d** *27* differential ic

P.C.Marin, Brit. J. Appl. Phys. 7, 188 (1956).

τ **3.825^d** *5* differential ic

J.Tobailem, Compt. rend. 233, 1360 (1951); Ann. Phys. 10, 783 (1955).

τ **3.825^d** *4* calorimeter

J.Robert, J. phys. radium 17, 605 (1956).

$Rn^{222}_{86\ 136}$ 3.8^{d}

$\gamma(Po^{218})$ Rn collected from Ra^{226} scin
~7† **0.510*** 2
Intensity remained constant for first 2 min after collection, ∴ not in decay of $3^{m}Po^{218}$
*No (0.51 γ)(0.51 γ), hence not $\gamma^{\pm}$
†Photons per 10^{4} disintegrations

L.Madansky, F.Rasetti, Phys. Rev. 102, 464 (1956).

$Fr^{211}_{87\ 124}$

τ Not 2^{m} to 5^{m*} Th^{232}(340-Mev p) chem
No Rn daughter observed

F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955); *Phys. Rev. 86, 805 (1952).

$Fr^{212}_{87\ 125}$ 19^{m}

Th^{232}(340-Mev p) chem

α	24†	**6.342** 7	s
	39†	**6.387** 9	
	37†	**6.411** 9	

F.F.Momyer, Jr., F.Asaro, E.K.Hyde, J. Inorg. Nucl. Chem. 1, 267 (1955).

$Fr^{221}_{87\ 134}$ 4.8^{m}

α(0.22γ) delay $< 1^{m\mu s}$ $10^{d}Ac^{225}$ source; scin

D.Strominger, F.S.Stephens, Jr., J.O. Rasmussen, Phys. Rev. 103, 748 (1956).

$Fr^{223}_{87\ 136}$ 22^{m}

d $22^{y}Ac^{227}$ chem
τ 22^{m} 1 from growth of $12^{d}Ra^{223}$ ppl
α 0.006% **5.34** 8 ppl
p Ra^{223} (τ, α and β spectra identified)

M.Perey, M.J.Adloff, J. phys. radium 17, 545 (1956); compt. rend. 240, 1421 (1955).

$Ra^{213}_{88\ 125}$ 2.7^{m}

τ **2.7**^{m} 3 Th^{232}(340-Mev p) chem
α **6.90** 4 ic
p $30^{m}Rn^{209}$ (6.02 α observed)

F.F.Momyer, Jr., E.K.Hyde, J. Inorg. Nucl. Chem. 1, 274 (1955).

$Ra^{225}_{88\ 137}$ 15^{d}

$\alpha/\beta^{-} < 0.01\%$ Th^{229} chem
No $25^{m}Rn^{221}$ observed ic

F.F.Momyer,Jr., E.K.Hyde, Phys. Rev. 101, 136 (1956).

β(0.040 γ) delay $< 4^{m\mu s}$

D.Strominger, J.O.Rasmussen, Phys. Rev. 100, 844 (1955).

$Ra^{226}_{88\ 138}$ 1620^{y}

(ce 0.186γ)/α = 0.028 5 ppl
(4.61α)(ce 0.186γ)(θ) J = 0, 2, 0

G.Albouy, Ann. Phys. 1, 99 (1956).

$Ac^{226}_{89\ 137}$ 29^{h}

$\gamma(Th^{226})$ **0.159** scin
0.232

F.S.Stephens,Jr., F.Asaro, I.Perlman, Phys. Rev. 100, 1543 (1955); J.R.Grover, G.T. Seaborg, ibid.

$Ac^{227}_{89\ 138}$ 22^{y}

β^{-} **0.0455** 10 pc
P-K linear ($E_{\beta} > 0.007$)
No 0.037 γ, no ce, no Th L x ray 4π pc
0.0167 5 and 0.020 1 γ's observed but growth suggests assignment to impurity

W.Beckmann, Z. Phys. 142, 585 (1955). Z.Naturf. 10a 86 (1955).

$Th^{227}_{90\ 137}$ 18^{d}

α(0.050γ) delay $< 2^{m\mu s}$ scin

R.Foucher, L.Dick, N.Perrin, H.Vartapetian, J. phys. radium 17, 581 (1956).

$Th^{228}_{90\ 138}$ 1.9^{y}

τ **1.910**^{y} 2 Ra^{226}(pile n) chem

H.W.Kirby, G.R.Grove, D.L.Timma, Phys. Rev. 102, 1140 (1956).

$\gamma(Ra^{224})$ **0.084** ppl α(ce)
ce/α = 0.25 2

G.Albouy, Ann. Phys. 1, 99 (1956).

$Th^{230}_{90\ 140}$ 8.0×10^{4y}

$\gamma(Ra^{226})$ 9% Th^{230}

59†	**0.068**		scin
7†	**0.142**		
1.4†	**0.184**	E1	
1.7†	**0.253**	E1	

E1 assignments from systematics
†Photons per 10^{4}α's

F.S.Stephens,Jr., F.Asaro, I.Perlman, Phys. Rev. 100, 1543 (1955).

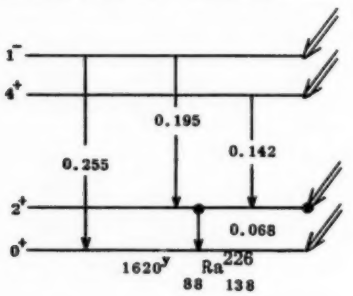
$\gamma(Ra^{226})$ **0.068** ppl α(ce)
ce/α = 0.23 2

G.Albouy, Ann. Phys. 1, 99 (1956).

Th^{230} 90 140 8.0×10^{4y} $\gamma(Ra^{226})$ 10% Th^{230} scin

	64 8†	0.068 1	α=46 5
	8 1†	0.142 2	
	0.5 2†	0.195 5	
	0.3 1†	0.255 3	
x	4 1†	K x ray	
	1100 150†	L x ray	

$\alpha(0.068\gamma, L\ x\ ray)$ delay $< 10^{-9}$s
(L x ray)(0.142, 0.195, 0.255γ; not 0.068γ)
$\omega_L = 0.52$ 5 from (L x ray)(0.142γ)/(0.142γ)
using $\alpha_L/(1+\alpha) = 0.73$ for the 0.068γ
†Photons per 10^4 disintegrations

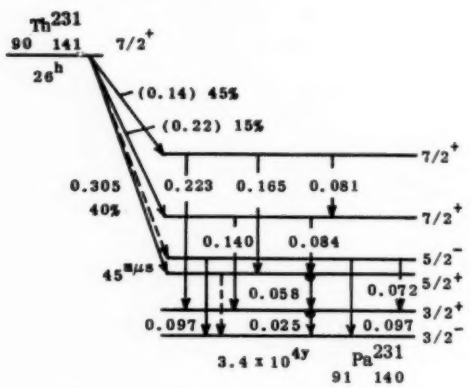


E.Booth, L.Mandansky, F.Rasetti, Phys. Rev. 102, 800 (1956).

Th^{231} 90 141 26^h β^- $\gamma(Pa^{231})$

0.305 10		
0.0255		sπ ce,pc,
0.0585	0.0974	scin
0.0719	0.140	
0.0812	0.1652	
0.0841	0.223	

(0.305β)(~0.08γ) delay = $45^{m\mu s}$ 3
(~0.08γ)(0.0255, 0.0585γ)



J.P.Wize, J.W.Starner, Bull. Am. Phys. Soc. 1, No. 4, 171 E6 (1956); verbal report.

β(0.026, 0.085γ) delay = $41^{m\mu s}$ 4

D.Strominger, J.O.Rasmussen, Phys. Rev. 100, 844 (1955).

Th^{232} 90 142 1.4×10^{10y} τ **1.45×10^{10y}** 5 Specific activity

R.L.Macklin, H.S.Pomerance, J. Nuclear Energy 2, 243 (1956).

τ for spontaneous fission $> 10^{20y}$ ic
From 0.002 fissions per hr gm of sample.
However half of these counts are due to presence of 0.006% U

A.V.Podgurskaya, V.I.Kalashnikova, G.A. Stolyarov, E.D.Vorob'ev, G.N.Flerov, Zhur. Eksptl' i Teoret. Fiz. 28, 503 (1955); AERE Lib/Trans. 569.

τ for spontaneous fission = 1.4×10^{18y}
From 0.15 fissions per hr gm of sample.
Less than 0.1 of these counts are due to U

E.Segrè, Phys. Rev. 86, 21 (1952).

$\gamma(Ra^{228})$ **0.059** 1 L/M~3 ppl α(ce)
ce/α = 0.24 3

S.W.Peat, M.A.S.Ross, Proc. Phys. Soc. 68A, 923 (1955).

$\gamma(Ra^{228})$ **0.060** ppl α(ce)
ce/α = 0.22 2

G.Albouy, Ann. Phys. 1, 99 (1956).

Th^{232} 90 142 Level $Th^{232}(\alpha,\alpha'\gamma)$ $E_\alpha = 3.3$; scin
γ **0.050** 5 τ = $780^{\mu\mu s}$ (α=340)

A.S.Divatia, R.H.Davis, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

γ $Th^{232}(p,p'\gamma)$ $E_p = 4.8$
1.1* **0.719** K/L = 3.5 sπ ce
*σ(90°) for ce_K in μb/sterad

M.S.Moore, C.M.Class, F.W.Prosser,Jr., J.P. Schiffer, Bull. Am. Phys. Soc. 1, No. 2, 88, H2 (1956).

Th^{233} 90 143 22^m τ **22.12^m** 5 Th^{232}(pile n,γ) chem

E.N.Jenkins, Analyst 80, 301 (1955).

Th^{233} 90 143

Resonances $Th^{232}(n)$ chopper

E_o(ev)	Γ_γ(mev)
(22.1, 23.8)	30 *10* for each

Used $\sigma_o\Gamma^2 = 7 \pm 2, 13 \pm 4$ for 22.1, 23.8 resonances respectively

J.S.Levin, D.J.Hughes, Phys. Rev. 101, 1328 (1956).

Resonances $Th^{232}(n)$ chopper

E_o(ev)	Γ_n(mev)	Γ_γ(mev)
22.0 *2*	1.24 *36*	28 *11*
23.6 *2*	3.35 *77*	25 *8*

E_o(ev)	Γ_n(mev)*	E_o(ev)	Γ_n(mev)*
60 *1*	6.8 *19*	210 4.5	1.8 *14*
70.7 *9*	44 *13*	225 5	16 *9*
115 *2*	15 *5*	235 5.4	14 *8*
125 *2*	25 *10*	260 *6*	45 *3*
135 *2.3*	15 *6*	270 *6.5*	60 *1:*
175 *3.4*	36 *10*	295 *7.5*	12 *7*
195 4	22 *7*	350 *9*	205 *50*

*Assuming Γ_γ = 25 mev

J.A.Radkevich, V.V.Vladimirsky, V.V.Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

Th^{234} 90 144 24^d

$\alpha/\beta < 10^{-6}$ ppl

S.Deutsch, M.Nikolic, Nuovo Cim. 2, 1326 (1955).

β^- 35% **0.100** *2* $s\pi\beta\gamma$

65% **(0.191)**

(0.100β)(0.090γ)

E.P.deHaan, G.J.Sizoo, P.Kramer, Physica 21, 803 (1955); 19, 1201 (1953).

$\gamma(Pa^{234})$ **(0.029)** α_L = 11 scin

β(0.063, 0.091γ) delay = 1.8$^{m\mu s}$ *3*

α_L from ω_L = 0.46 and measured ratio (0.063 γ)(L x ray)/(0.063 γ)(0.029γ)

H.Vartapetian, L.Dick, R.Foucher, N.Perrin, J. phys. radium 17, 537; Compt. rend. 242, (1956).

$\gamma(Pa^{234})$ 5% **0.0290** d U^{238} chem

5% **0.0628** α_L = 0.45

16% **0.0914** α_{L1} = 2.0 L/MN = 3.1

(~0.08β)(ce_K 0.0914 γ)

No 0.0471 γ (ce's reinterpreted)

No 0.100 γ (assigned to 6.7^hPa^{234})

No 0.043 γ (assigned to 1.2^m and 6.7^hPa^{234})

Ong Ping Hok, J.T.Verschoor, P.Born, Physica 22, 465 (1956).

Pa^{231} 91 140 3.4x10^4^{y} α sd

1.3%	4.6710 *50*	
0.8%	4.7040 *80*	?
10%	4.7270 *50*	
1.5%	4.8476 *50*	
24%	4.9420 *70*	
1.5%	4.9740 *60*	
26%	5.0060 *70*	
23%	5.0205 *45*	
12%	5.0490 *30*	

No α with 4.7270 $\leq E_\alpha \leq$ 4.8476 (< 0.1%)

L.L.Gol'din, E.F.Tret'yakov, G.I.Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242.

$\gamma(Ac^{227})$ **(0.027)**

0.290 α_K~0.05 E1 $x_K\gamma/\gamma\gamma$

(α, 0.290 γ)(0.027 γ) delay = 37$^{m\mu s}$

R.Foucher, L.Dick, N.Perrin, H.Vartapetian, J. phys. radium 17, 581 (1956).

Interpretation of α(ce)(ce) coincidences ppl	Number per 10^3 α's
α(0.011 γ)(0.027 γ)	30 to 50
α(0.064 γ)(0.038 or 0.027 γ)	40 to 70
α(0.096 γ)(0.102 γ)	0.3 to 6
α(0.096 γ)(0.064 γ)	0.6 to 0.9
α(0.064 γ)(0.011 γ)(0.027 γ)	15 to 20
α(0.096 γ)(0.064 γ)(0.038 or 0.027 γ)	3 to 4
α(0.096 γ)(0.064 γ)(0.011 γ)(0.027 γ)	0.6 to 1

Results agree with decay scheme of Falk-Vairant but not with that of Gol'din, et al. or Hummel, et al.

G.Albouy, Ann. Phys. 1, 99 (1956).

Pa^{234} 91 143 6.7^h g.s.

β^- 28%* **0.155** d 24^dTh^{234} chem; sd

32% **0.32** *2*

27% **0.53** *2*

13% **1.13** *5*

$\gamma(U^{234})$

		ce's per 1000 β's				
		K	L_1	L_2	L_3	M
20%	**0.0430**			65	60	51 scin,
14%	**0.0992**			59	44	28 sd ce
15%	**0.125**					
7%	**0.153**			15	7	5.5
13%	**0.225**	44	7.5			2
	0.293					
	0.333					
3.5%	**0.368**	6	1.7			
7%	**0.566**	6	1.7			
	0.603					
9%	**0.732**	1.2	0.7			
0.2%	**0.803**	1.2	0.5			
14%	**0.877**	1.5	1.1			0.9
25%	**0.924**	1.1				

Continued

Pa^{234} 91 143 6.7^h g.s.

Continued

$\gamma(U^{234})$ 1.24

3.5% 1.43 *3*

2.5% 1.68 *3*

*Uncertain (10% from γ intensities)

Ong Ping Hok, J.T.Verschoor, P.Born, Physica 22, 465 (1956); 19, 1205 (1953); Phys. Rev. 99, 1613 (1955).

Pa^{234} 91 143 1.2^m

τ 1.25^m *10* d $24^d Th^{234}$ chem, $24^d Th^{234}$ source

$\gamma(U^{234})$

2.5%	0.0430			sd ce, scin
	0.230	1.5%	1.01	
0.10%	0.255		1.24	
0.87%	0.770	0.09%	1.44	
0.16%	0.803	0.07%	1.69	
	0.807	0.11%	1.83	

$1.2^m Pa^{234}$ level 0.060 *15* above $6.7^h Pa^{234}$ from tentative decay scheme

Ong Ping Hok, J.T.Verschoor, P.Born, Physica 22, 465 (1956).

β^- 0.60 Th^{234} source; $s\pi$ $\beta\gamma$

1.50

$\gamma(U^{234})$ (0.80) $\alpha_K = 0.15^*$ M2

*Assuming proposed decay scheme

E.F.deHaan, G.J.Sizoo, P.Kramer, Physica 21, 803 (1955).

U 92 Relative isotopic abundances ms

U^{234}	0.0056% *1*
U^{235}	0.718% *5*
U^{238}	99.276% *5*

No U^{232}, U^{233} ($< 6 \times 10^{-5}$%)
No U^{236} ($< 2 \times 10^{-4}$%)
No U^{237}, U^{239} ($< 1 \times 10^{-4}$%)
No U^{240} ($< 5 \times 10^{-5}$%)

F.M.White, T.L.Collins, F.M.Rourke, Phys. Rev. 101, 1786 (1956).

Relative isotopic abundances ms

U^{234}	0.0057%* *2*
U^{235}	0.7204% *7*
U^{238}	99.2739% *7*

*Assumed value

M.Lounsbury, Can. J. Chem. 34, 259 (1956).

U 92 Level $U(n,n')$ $E_n = 0.5$ to 1.0

0.70 sphere, He^3 pc

R.Batchelor, Proc. Phys. Soc. 69A, 214 (1956).

U^{233} 92 141

ground state

J 5/2 S

$\mu(U^{233})/\mu(U^{235}) = -1.8$ *1* Used $J(U^{235}) = 5/2$

$q(U^{233})/q(U^{235}) = +2.0$ *3*

N.I.Kaliteevskii, M.P.Chaika, Doklady Akad. Nauk SSSR 103, 49 (1955).

ground state

J 5/2 S

$\mu(U^{233})/\mu(U^{235}) \sim -1.5^*$

*From comparison with published data on same line in U^{235} spectrum. Used $J(U^{235}) = 5/2$

L.A.Korostyleva, A.R.Striganov, N.M.Iashin, Zhur. Eksptl' i Teoret. Fiz. 28, 471 (1955); Soviet Phys. JETP 1, 310 (1955); Izvest. Akad. Nauk. Ser. Fiz. SSSR 19, 31 (1955).

U^{233} 92 141 $1.6 \times 10^5 y$

α	0.03%	4.489 *5*	1.6%	4.7174 *10*	sd
	0.04%	4.582	14.9%	4.7732 *4*	
	0.07%	4.655	83.5%	4.8157 *5*	

L.L.Goldin, G.I.Novikova, E.F.Tretyakov, Phys. Rev. 103, 1004 (1956); Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL-Trans. 242.

α's emitted preferentially in the direction perpendicular to nuclear axis $\alpha(\theta,T)$

$W(\theta) = 1 - 0.06P_2(\cos\theta)$ at 1.1°K

J.W.T.Dabbs, L.D.Roberts, G.W.Parker, Bull. Am. Phys. Soc. 1, No. 4, 207 R9 (1956).

Th^{232}(pile n) chem

$\gamma(Th^{229})$ ~0.040 L/MN = 3 ± 1 ppl

~0.09

(ce 0.054 γ)(ce 0.040γ)/α = 0.003 *1*

G.Albouy, Ann. Phys. 1, 99 (1956).

U^{234} 92 142 $2.5 \times 10^5 y$

α	28%	4.7168 *10*	sd
	72%	4.7683 *10*	

L.L.Gol'din, E.F.Tret'yakov, G.I.Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242.

U^{234} 92 142

Resonances $U^{233}(n)$ cryst

σ_{to}	E_o(ev)	Γ(mev)	Γ_f(mev)
975	1.785	300	270
1020	2.290	100	70
233	3.635	198	168
1015	6.795	187	157
680	10.375	294	264

V.L.Sailor, Phys. Rev. 100, 1249A (1955); verbal report.

Resonances $U^{233}(n,f)$ $E_n = 10^{-3}$ to 10^3 ev cryst

1.80 2 ev 5.1
2.30 2 7
3.5 12

J.M.Auclair, M.Galula, P.Hubert, B.Jacrot, R.Joly, F.Netter, G.Vendryes, Geneva Conf. 8/P/354 (1955).

U^{234} 92 142 2.4×10^{5}y

Resonances $U^{233}(n,f)$ $E_n = 0.035$ to 5.3 ev

1.80 2 ev $\Gamma = 0.36$ ev cryst
2.30 2 $\Gamma = 0.17$
3.6
4.7

L.G.Miller, J.E.Evans, Bull. Am. Phys. Soc. 1, No. 5, 247 C5 (1956).

U^{235} 92 143

ground state

J 7/2 para
$|\mu|$ 0.38 or 0.31

C.A.Hutchison, Jr., P.M.Llewellyn, E.Wong, P.Dorain, Phys. Rev. 102, 292 (1956).

ground state S

J 5/2 (7/2?)
$\mu(U^{233})/\mu(U^{235}) = -1.8$ *1*
$q(U^{233})/q(U^{235}) = +2.0$ *3*

N.I.Kaliteevskii, M.P.Chaika, Dokoady Akad. Nauk SSSR 103, 49 (1955).

U^{235} 92 143 7.1×10^{8}y

(4.40 α)(0.188 γ) scin

P.Huber, K.P.Meyer, E.Würger, Helv. Phys. Acta 28, 326A (1955).

$\gamma(Th^{231})$ enriched U^{235} scin

~13† 0.146 *3*
55† 0.188 2
3.7† 0.209 4 ?
0.03† 0.349 4 ?

No other γ with $0.26 < E_\gamma < 0.45$ (< 0.01†)
†Photons per 100 α's

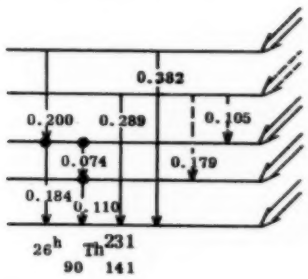
C.W.Malich, Bull. Am. Phys. Soc. 1, No. 1, 43 K12 (1956).

U^{235} 92 143 7.1×10^{8}y

$\gamma(Th^{231})$

0.074	0.200 scin $\gamma\gamma$
0.110	0.289
0.184	0.382

(~0.075 γ)(0.110, 0.200γ)
(~0.105 γ)(0.074, 0.200γ)
(~0.180 γ)(K x ray, 0.200γ)
(~0.195 γ)(K x ray, 0.184γ)
No (> 0.200γ)γ
Gating channel width ~20 kev



S.A.E.Johansson, Arkiv Fysik 10, 97 (1956).

U^{236} 92 144

Resonances $U^{235}(n)$ chopper

E_o(ev)	$2g\Gamma_n$(mev)$^\$$	E_o(ev)	$2g\Gamma_n$(mev)$^\$$
9.25 *5*	0.16 *5*		
9.70 *5*	0.069 *16*	25.9 *4*	0.39 *13*
10.13 *5*	0.054 *16*	26.8 *4*	0.83 *21*
10.6?		28.0 *4*	0.69 *11*
11.6 *1*	0.58 *5*	28.6 *4*	0.35 *11*
12.4 *1*	1.40 *9*	29.9 *5*	0.26 *11*
12.8 *1*	0.050 *18*	31.1 *5*	1.11 *17*
13.3 *1*	0.110 *18*	32.3 *5*	2.3 *6*
13.8?		33.8 *5*	2.0 *4*
14.1 *1*	0.34 *4*	34.7 *6*	2.6 *5*
14.7 *1*	0.122 *19*	35.3 *6*	5.3 *9*
15.5 *1*	0.213 *20*	38.4 *7*	0.16 *4*
16.2 *1*	0.350 *20*	39.7 *7*	2.5 *6*
16.8 *2*	0.226 *20*	42.0 *7*	2.2 *6*
17.5?		43.7 *8*	1.0 *3*
18.2 *2*	0.338 *13*	44.8 *8*	1.8 *5*
19.5 *2*	2.78 *18*	47.1 *8*	1.2 *3*
20.3?		48.6 *9*	5.2 *11*
21.2 *2*	1.29 *28*	51.6 *9*	46 *11*
23.2 *3*	0.63 *10*	55.4 *10*	2.9 *6*
23.7 *3*	1.51 *10*	56.4 *10*	8.6 *19*
24.5 *3*	0.64 *10*	58.3 *10*	3.8 *8*
25.6 *3*	0.61 *15*	61.0 *11*	1.2 *6*

$U^{235}(n,f)$

E_o(ev)	Γ_f(mev)$^\$$	E_o(ev)	Γ_f(mev)$^\$$
11.6 *1*	9 *11*		
12.4 *1*	16 *12*	23.7 *3*	105 *81*
16.2 *1*	12 *17*	34.7 *6*	48 *27*
19.5 2	79 *22*	35.3 *6*	82 *33*

$^\$$Used $\overline{\Gamma}_\gamma = 30$ mev.

O.D.Simpson, R.G.Fluharty, F.B.Simpson, Phys. Rev. 103, 971 (1956); 100, 1249A (1955).

U^{236} 92 144

Resonances $U^{235}(n,f)$ $E_n = 0.005$ to 150 ev cryst, chopper

E_o(ev)	Peak σ_f*
−0.01 to 0.01	
1.12	85
3.55	98
6.3	130
7.0	89
8.7	840
12.2	450
19.5	640
33.5	960

*Assuming $\Gamma = 0.15$ ev

B.T.Price, J.Nuclear Energy 2, 128 (1955).

Resonances $U^{235}(n,f)$ $E_n = 10^{-3}$ to 200 ev cryst

0.29 ev	6.8
1.1	9
3.4	14

J.M.Auclair, M.Galula, P.Hubert, B.Jacrot, R.Joly, F.Netter, G.Vendryes, Geneva Conf. 8/P/354 (1955).

Resonances $U^{(235)}(n,f)$ pulsed n's

σ_{fo}*	E_o(ev)	$\sigma_f\Gamma$	Γ_γ/Γ_f
1278	8.8	110	0.5
100	11.7	7.4	6
624	12.34	43.7	2
1479	19.3	103.5	1

*From $\sigma_f\Gamma/\sigma_t\Gamma$ and σ_{to}

M.L.Yeater, W.R.Mills, D.E.McMillan, E.R. Gaerttner, Bull. Am. Phys. Soc. 1, No. 1, 8, A5 (1956); verbal report.

U^{237} 92 145 6.75^d

β^- 26% 0.084 $U^{236}(n,\gamma)$ chem; sd
74% 0.249

$\gamma(Np^{237})$

0.026	0.165	sd ce
0.033	0.193 ?	
0.043	0.208	
0.060	0.268	
0.069 ?	0.330	
0.101	0.370	
0.124 ?	0.433	

S.A.Baranov, K.N.Shlyagin, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 251 July (1955); Consultants Bureau Trans. p. 183.

U^{238} 92 146 4.5x10^{9}y

$\gamma(Th^{234})$ 0.048 ppl α(ce)
ce/α = 0.23 2

G.Albouy, Ann. Phys. 1, 99 (1956); G.Albouy, J.Teillac, Compt. rend. 234, 829 (1952).

U^{238} 92 146

Level $U^{(238)}(\alpha,\alpha'\gamma)$ E_α = 3.3; scin
γ 0.045 3 $\tau = 440^{+440}_{-148}$ (α = 700)

A.S.Divatia, R.H.Davis, R.D.Moffat, D.A.Lind, Phys. Rev. 100, 1266A (1955); verbal report.

U^{238} 92 146

Levels $U^{238}(n,n')$ E_n = 2.45 pulsed n's

$\sigma(90°)$	Level	
10 3	1.18 3	double

σ units: mb/sterad

L.Cranberg, J.S.Levin, Phys. Rev. 103, 343 (1956); Bull. Am. Phys. Soc. 1, No. 1, 56 R10 (1956).

U^{239} 92 147

Resonances $U^{(238)}(n)$ chopper

$\sigma_o(10^3$b)	E_o(ev)	$\Gamma(10^{-3}$ev)	$\Gamma_\gamma(10^{-3}$ev)
23 3	6.70 6	26 2	24 2
27 6	21.1 2	38 6	30 6
30 10	37.1 4	70 20	40 20

J.S.Levin, D.J.Hughes, Phys. Rev. 101, 1328 (1956).

Resonances $U^{(238)}(n)$ chopper

$\sigma_o(10^3$b)	E_o(ev)	Γ_n(mev)*	Γ_γ(mev)
20.0 18	6.69 2.5	1.15 4	21.2 13
17.0 25	21.0 1	6.35 59	36.0 35
25.0 75	37.0 4	22.0 35	34 10
14 10	67.7 8	19.1 45	25 12
	83 11	2.7 11	21 15
	90 12	0.09 8	
	105 1.4	52 5	
	120 2	38 2	
	135 2.3	2.4 19	
	142 2.4	0.5 4	
	146 2.5	4 3	
	165 3	0.97	
	194 3.5	119 10	
	202 4	75 6	
	240 5	70 21	
	254 6	20 11	
	272 7	55 7	
	291 8	148 1	
	355 10	140 90	
	405 12	260 80	

*Assuming $\bar{\Gamma}_\gamma$ = 30 mev

J.A.Radkevich, V.V.Vladimirsky, V.V.Sokolovsky, Amsterdam Conf. Nuclear Reactions, July 1956; Physica 22 (1956).

Np^{234} 93 141 4.4^d

$\gamma(U^{234})$ 0.043 L_2/L_3 = 1.4 sl ce,

0.099 ?		scin
0.109	0.740*	
0.151	0.752	
0.234	0.780*	
0.247	0.810	
0.449	0.940*	
0.486	1.010*	
0.502*	1.200*	
0.516	1.565	

(0.502 γ)(0.449, 0.740, 1.010 γ) scin
(0.740 γ)(0.449, 0.780 γ)
(0.940 γ)(0.502, 0.585 γ) *scin only

J.R.Huizenga, D.W.Engelkemeir, M.S.Freedman, F.T.Porter, J.T.Gindler, Bull. Am. Phys. Soc. 1, No. 4, 171 E7 (1956); verbal report.

Np^{235} 93 142 410^{d}

$\gamma(Pa^{231})$	0.026		scin $\alpha\gamma$
	0.085		

$\alpha\gamma$ delay = $37^{m\mu s}$ 4
$\alpha/\epsilon = 3.5 \times 10^{-5}$ 4
$(0.085\gamma)/\alpha = 0.054$ 5

x	762†	U K x rays		scin
	4600†	U L_{α} x ray	106†	$x_K x_{L\alpha}$ pc
	4240†	U L_{β} x ray	89†	$x_K x_{L\beta}$
	1080†	U L_{γ} x ray	12†	$x_K x_{L\gamma}$

No $\gamma(U^{235})$
$\therefore \epsilon_L/\epsilon_K = 30$ 2 and $E_{dis} = 0.130$. Used $\omega_K = 0.98$, $\omega_L = 0.42$, and the measured ratio $(x_L - x_L x_K)/x_K$

R.W.Hoff, J.L.Olsen, L.G.Mann, Phys. Rev. 102, 805 (1956).

Np^{236} 93 143 22^{h}

β^-	0.518 *10*			sl
γ	0.0435 *10*	L : M : N		
	0.0442 *10*	48 : 18 : 3		sd ce

No 0.150γ (0.038 ce now interpreted as ce_M 0.044γ's rather than ce_K 0.150γ)
$ce/\beta \sim 0.35$

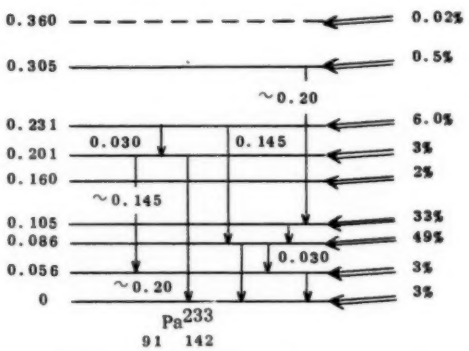
P.R.Gray, Phys. Rev. 101, 1306 (1956); *G.D. O'Kelley, ibid.

Np^{237} 93 144 2.2×10^{6y}

α	0.02%	4.52	33%	4.767	ic
	0.5%	4.589	49%	4.787	
	6.0%	4.644	3%	4.816	
	3%	4.674	3%	4.872	
	2%	4.713			

$\gamma(Pa^{233})$			scin, pc, s ce
	<3†	0.020	$\alpha > 10$
	16†	0.029	$\alpha_L = 2.8$
	<1†	0.0568	$\alpha_L > 44$
	16†	0.0869	$\alpha_L = 0.75$
	1†	0.145	$\alpha_L = 0.15$
	0.1†	0.175	
	0.3†	0.200	
x(Pa)	130†	L x ray	
	5†	K x ray	

†Photons per 100 α's
Level scheme supported by $\alpha\gamma$, $\gamma\gamma$, α(ce)



L.B.Magnusson, D.W.Engelkemeir, N.S.Freedman, F.T.Porter, F.Wagner, Jr., Phys. Rev. 100, 1237A (1955); verbal report.

Np^{237} 93 144 2.2×10^{6y}

α's emitted preferentially in the direction perpendicular to nuclear axis $\alpha(\theta, T)$
$W(\theta) = 1 - 0.07 P_2(\cos\theta)$ at 1.1°K

L.D.Roberts, J.W.T.Dabbs, G.W.Parker, R.D. Ellison, Bull. Am. Phys. Soc. 1, No. 4, 207 R8 (1956).

Np^{239} 93 146 2.3^{d}

τ	2.346^{d} 4	$U^{(238)}(n,\gamma)$	chem

L.Wish, Nucleonics 14, No. 5, 102 (1956).

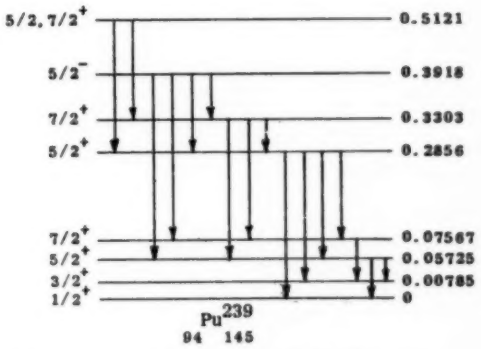
$\gamma(Pu^{239})$		$U^{(238)}(n,\gamma\beta)$	chem
16†	0.44	4π ic,	scin
19†	0.49		

†Photons per 10^5 β's

H.W.Lefevre, E.M.Kinderman, H.H.Van Tuyl, Phys. Rev. 100, 1374 (1955).

$\gamma(Pu^{239})$		U^{238}(pile n,$\gamma\beta$)	chem
~300*	0.04464	M1/E2 = 4	$s\pi$ ce
475*	0.04940	M1/E2 = 2.3	
1275*	0.05725	M1/E2 < 0.05	
~10*	0.0614	E1 (ce_{L1} only)	
800*	0.06782	E2	
500*	0.1061	E1	
	0.1064		
	0.1253?		
	0.1818		
700*	0.2099	M1/E2 > 2.3	
	0.2264		
1980*	0.2284	M1/E2 > 4	
	0.2546		
	0.2731		
1400*	0.2778	M1/E2 > 9	
	0.2856		
	0.3161		
	0.3345		

Multipole mixtures from $L_1 : L_2 : L_3$
*Relative ce intensity (assuming L/MN ~ 3)
$(\sim 0.23\gamma)(\sim 0.23\gamma)/(\sim 0.23\gamma)(\sim 0.275\gamma) = 2$
Proposed decay scheme suggests J = 5/2 or 3/2 for Np^{239} g.s.



J.M.Hollander, W.G.Smith, J.W.Mihelich, Phys. Rev. 102, 740 (1956); 100, 1238A (1955); §D.Strominger, ibid.

$Np^{240}_{93\ 147}$ 1^h 5.s.

$\gamma(Pu^{240})$ $Np^{239}(n,\gamma)$ chem

72†	0.88	scin
100†	0.97	
9†	1.14	

H.W.Lefevre, E.M.Kinderman, H.H.Van Tuyl, Bull. Am. Phys. Soc. 1, No. 1, 62 UA6 (1956); verbal report.

$Np^{240}_{93\ 147}$ 7.3^m

Not p $1^h Np^{240}$ (< 5%)

H.W.Lefevre, E.M.Kinderman, H.H. Van Tuyl, Bull. Am. Phys. Soc. 1, No. 1, 62 UA6 (1956).

$Pu^{238}_{94\ 144}$ 90^y

α	31%	5.4499 *7*	sd
	69%	5.4909 *5*	

L.L.Gol'din, E.P.Tret'yakov, G.I.Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242.

$Pu^{239}_{94\ 145}$

ground state

J 1/2 S

L.A.Korostyleva, A.R.Striganov, N.M.Iashin, Zhur. Eksptl' i Teoret. Fiz. 28, 471 (1955); Soviet Phys. JETP 1, 310 (1955); Izvest. Akad. Nauk Ser. Fiz. SSSR 19, 31 (1955).

N.I.Kaliteevskii, M.P.Chaika, Doklady Akad. Nauk SSSR 103, 49 (1955).

$Pu^{239}_{94\ 145}$ $2.4 \times 10^4 y$

α	10.7%	5.0963 *3*	sd
	16.8%	5.1344 *3*	
	72.5%	5.1474 *2*	
$\gamma(U^{235})^*$		0.0125	sd ce
		0.0383	
		0.0508	

No other α's from 4.9 to 5.33 (< 0.2%)

L.L.Gol'din, E.P.Tret'yakov, G.I.Novikova, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL Trans. 242. *K.N.Shlyagin, ibid.

$\gamma(U^{235})^*_{120}$ { ~0.038 ~0.050 ppl α(ce)

ce ~1* ~0.10

(ce 0.038 γ)(ce ~0.01γ)/α = 0.013 *4*

*ce per 1000 α's

G.Albouy, Ann. Phys. 1, 99 (1956).

$Pu^{239}_{94\ 145}$? 155 tracks (range 100 to 300 μ) observed in ppl from Pu^{239} source. Similiar tracks seen with active deposit of Po, Ac, and Th

M.Ader, Compt. rend. 241, 1748 (1955).

$Pu^{240}_{94\ 146}$ 6580^y

τ 6600^y *100* Pu^{239}(pile n,γ) chem specific activity

J.P.Butler, T.A.Eastwood, T.L.Collins, M.E. Jones, F.M.Rourke, R.P.Schuman, Phys. Rev. 103, 634; Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

α	0.085%	5.004	sd
	24.5%	5.1147 *5*	
	75.5%	5.1589 *3*	
$\gamma(U^{236})^*$		0.0446	sd ce

Transition to 6^+ level not yet detected

L.L.Goldin, G.I.Novikova, E.P.Tretyakov, Phys. Rev. 103, 1004 (1956); Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 226 July (1955); UCRL-Trans. 242; *K.N.Shlyagin, ibid.

$Pu^{240}_{94\ 146}$

Resonances $Pu^{239}(n)$ chopper, cryst

	E_o(ev)	Γ(ev)	$g\Gamma_n$(mev)
$\sigma_o\Gamma^2 = 1.6$	0.01	0.063	0.001
$\sigma_o = 5300$	0.300 *5*	0.101 *5*	0.063 *3*

Resonances also observed at 7.8, 11.3, 16 ev

N.J.Pattenden, J. Nuclear Energy 2, 187 (1956).

Resonances $Pu^{239}(n)$ E_n = 0.03 to 20 ev

0.297 ev 11.5 chopper

8 15

$Pu^{239}(n,f)$ $E_n = 10^{-3}$ to 100 ev

0.297 *3* Γ=90 *10* mev cryst

σ_o = 3000

J.M.Auclair, M.Galula, P.Hubert, B.Jacrot, R.Joly, F.Netter, G.Vendryes, Geneva Conf. 8/P/354 (1955).

Resonance $Pu^{239}(n)$ cryst

0.300 *5* ev Γ = 105 *5* mev

σ_o = 4600 *300*

N.Galanina, K.Ignatyev, S.Nikitin, S. Sukhoruchkin, quoted by Yu.G.Abov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 249 July (1955); Consultants Bureau Trans. p. 209.

Pu^{240} 94 146

Resonances $Pu^{239}(n,f)$

0.3 ev	
7.8	17.6
11.0	22.2
11.9	42
14.3	44.5
14.7	50
15.3	53

R.E.Coté, L.M.Bollinger, J.M.LeBlanc, G.E. Thomas, Bull. Am. Phys. Soc. 1, No. 4, 187 K5 (1956).

Resonances $Pu^{239}(n,f)$ E_n = 0.007 to 700 ev
0.297 ev Γ = 98 *3* mev cryst,
σ_o = 2940 *100* chopper

E_o(ev)	σ_o^*	E_o(ev)	σ_o^*
8.0 *2*	840	18.3 *5*	750
11.2 *3*	1930	22.8 *7*	1030
15.1 *4*	1530	26.8 *9*	490

*Assuming Γ = 100 mev

R.Richmond, B.T.Price, J. Nuclear Energy 2, 177 (1956).

Pu^{241} 94 147 13^y

τ 12.95^y *28* Pu chem
From growth of 0.060*y* of 461.3^yAm^{241}

B.Rose, J.Milsted, J. Nuclear Energy 2, 264 (1956).

τ 12.8^y *3*
From growth of Am^{241}

J.Mech, G.Pyle, ANL-4926 (1953); NSA 10, No. 2556 (1956).

τ_a 2.9 x 10^{5y} *5*
From equilibrium activity of 6.75^dU^{237}

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, KAPL-1378 (1955).

Pu^{241} 94 147

Resonance $Pu^{240}(n)$ chopper, cryst

$\sigma_o(10^5 b)$	E_o(ev)	Γ_n(mev)	Γ_γ(mev)
1.5 *2*	1.06 *1*	1.80 *40*	27 *6*

N.J.Pattenden, J.Nuclear Energy 2, 187 (1956).

Resonance $Pu^{(240)}(n)$ cryst

$\sigma_o(10^5 b)$	E_o(ev)	Γ(mev)	Γ_n(mev)
1.78 *16*	1.075 *5*	42 *5*	6.2 *9*

Y.G.Abov, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p.249 July (1955); Consultants Bureau Trans. p.209.

Pu^{242} 94 148 $3.8x10^{5y}$

Pu^{239}(pile n) chem; ms
τ 3.79 x 10^{5y} *5* specific activity

J.P.Butler, T.A.Eastwood, T.L.Collins, M.E. Jones, F.M.Rourke, R.P.Schuman, Phys. Rev. 103, 634; Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

Am^{241}(pile n,$\gamma\epsilon$) chem
τ 3.73 x 10^{5y} *5* ic,ms
From ratios of α's and atoms of Pu^{242} and Pu^{238} using τ = 89.6^y for Pu^{238}
τ for spontaneous fission = 6.64 x 10^{10y} *10*

J.P.Butler, M.Lounsbury, J.S.Merritt, Can. J. Chem. 34, 253 (1956).

Pu(pile n) chem; ms
τ_a 3.88 x 10^{5y} *10* ic
Based on $\tau(Pu^{240})$ = 6580^y
τ for spontaneous fission = 7.1 x 10^{10y} *2*

J.Mech, M.Diamond, M.H.Studier, P.R.Fields, A.Hirsch, C.M.Stevens, R.F.Barnes, D.J. Henderson, J.R.Huizenga, Phys. Rev. 103, 340 (1956).

Pu(pile n) chem
τ for spontaneous fission ~ 8.5 x 10^{10y}

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, KAPL-1378 (1955).

Pu^{242} 94 148

Resonances $Pu^{241}(n,f)$ E_n = 0.01 to 9 ev
0.255 *20* Γ = 103 *20* mev cryst,
σ_o = 1420 *150* chopper
4.45 *10* Γ = 470 mev (double?)
5 to 7.5 3 resonances

R.Richmond, B.T.Price, J. Nuclear Energy 2, 177 (1956).

Pu^{244} 94 150 $7.5x10^{7y}$

τ - 7.5 x 10^{7y} 2 Pu^{239}(pile n) chem
From milking of ^{14}U^{240} from Pu ms

J.P.Butler, T.A.Eastwood, T.L.Collins, M.E. Jones, F.M.Rourke, R.P.Schuman, Phys. Rev. 103, 634; Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

Pu(pile n) chem;ms
τ 7.6x10^{7y} *20* counted 7.3^mNp^{240}

H.Diamond, R.Barnes, Phys. Rev. 101, 1064 (1956).

Pu^{244} 94 150 7×10^{7y}

τ for spontaneous fission = 2.5×10^{10}y 8

P.R.Fields, J.E.Gindler, A.L.Harkness, M.H. Studier, J.R.Huizenga, A.M.Friedman, Phys. Rev. 100, 172 (1955).

Pu^{245} 94 151 10^{h}

τ	**10.6**^{h} 4	Pu^{244}(pile n,γ) chem	
From milking of 2.0^{h}Am^{245} from Pu			

J.P.Butler, T.A.Eastwood, T.L.Collins, M.E. Jones, F.M.Rourke, R.P.Schuman, Phys. Rev. 103, 634; Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

τ	**10.1**^{h} 5	Pu^{244}(pile n,γ) p 25^{m}Am chem	

P.R.Fields, M.H.Studier, A.M.Friedman, H. Diamond, R.Sjoblom, P.A.Sellers, J. Inorg. Nucl. Chem. 1, 262 (1955).

τ	**12**^{h} 1	Pu^{239}(pile n) chem	

C.I.Browne, D.C.Hoffman, W.T.Crane, J.P. Balagna, G.H.Higgins, J.W.Barnes, R.W.Hoff, H.L.Smith, J.P.Mize, M.E.Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).

Pu^{246} 94 152 11^{d}

τ		**11.2**^{d} 2	H-bomb debris, chem; ms		
β^-		**0.15**			a
$\gamma(Am^{246})$		**0.043**		**0.175**	scin
		0.111 3		**0.224** 10	
p 25^{m}Am chem					

D.Engelkemeir, P.R.Fields, S.Fried, G.L.Pyle, C.M.Stevens, L.B.Asprey, C.I.Browne, H.L. Smith, R.W.Spence, J.Inorg.Nuclear Chem. 1, 345 (1955).

τ		**10.85**^{d} 2			
β^-	73%	**0.15** 1			scin $\beta\gamma$
	27%	**0.33** 3			
$\gamma(Am^{246})$					scin $\gamma\gamma$
	330†	**0.027** 3	$\alpha \leq 1.9$		γ/γ
	780†	**0.047** 2	$\alpha \leq 0.23$		γ/γ
	90†	**0.075 to 0.085**			
	w	**0.099** 5			
	84†	**0.175** 5	$\alpha_K \sim 6$	K/L = 4.8*	x/γ
		0.215 10			scin
x	500†	K x ray			

(0.15β)(0.047, 0.175γ) (0.33β)(0.047γ)
(0.175 γ)(0.027, 0.047, 0.070? γ)
(0.047 γ)(0.027, 0.075 to 0.085, 0.099, 0.175γ, L x ray, K x ray)
No 0.40β (< 5% from equality of intensity of Pu^{246} and Am^{246} β's

D.C.Hoffman, C.I.Browne, J. Inorg. Nuclear Chem. 2, 209 (1956); *H.L.Smith et al., ibid.

Am^{239} 95 144 12^{h}

α	0.003%*			Pu^{239}(18-Mev d,2n)
$\gamma(Np^{235})$ 5†	**0.0483** 15	E1		pc
α(0.048γ)				
†Photons per 10 α's				

F.Asaro, F.S.Stephens,Jr., W.M.Gibson, R.A. Glass, I.Perlman, Phys. Rev. 100, 1541 (1955); *G.H.Higgins, ibid.

Am^{241} 95 146

	ground state	
J	**5/2**	S
q	**large**	

R.Thorne, Nature 178, 484 (1956).

	ground state	
μ	**+1.4**	S
q	**+4.9**	

T.E.Manning, M.Fred, F.S.Tomkins, Phys. Rev. 102, 1108 (1956).

Am^{241} 95 146 461^{y}

τ	**461.3**^{y} 17	specific activity	

G.R.Hall, T.L.Marken, J. Inorg. Nuclear Chem. 2, 202 (1956).

α	0.002%	**5.241**? 5				sd
	0.015%	**5.321** 3	85%	**5.4820** 6		
	1.66%	**5.3860** 5	0.24%	**5.5082** 5		
	12.7%	**5.4391** 6	0.39%	**5.5408** 6		

L.L.Goldin, G.I.Novikova, E.F.Tretyakov, Phys. Rev. 103, 1004 (1956); Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math Sci. p. 226 July (1955); UCRL-Trans. 242.

$\gamma(Np^{237})$ d Pu^{241}; sd ce

		L_1 :	L_2 :	L_3	
85*	**0.02638**	9	20	13	E1
119*	**0.03322**	51	12	12	M1 + (E2?)
137*	**0.04343**	40	33	26	E2 + M1
10*	**0.05552**	4	3		
350*	**0.05962**	73	155	33	E2/M1 = 9
	0.09880				

*Relative ce intensities

S.A.Baranov, K.N.Shlyagin, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 251 July (1955); Consultants Bureau Trans. p. 183.

Am^{241} 95 146 461^{y}

$\gamma(Np^{237})$ scin

27†	(0.0264)	370†	(0.0596)
~0.6†	(0.0434)	0.2†	(0.0988)

x 370† L x ray

†Photons per 10^3 α's

L.B.Magnusson, D.W.Engelkemeir, Bull. Am. Phys. Soc. 1, No. 4, 171 E8 (1956); verbal report.

$\gamma(Np^{237})$

	$L_1:L_2:L_3$	$M_1:M_2:M_3:M_{45}$
(0.033)		~4 :~1: 1
(0.043)	10: 10: 10	
(0.056)	~1: 1	~1 :~1: 1
(0.060)*	15: 33: 10	17 : 36: 10: 1
(0.099)	~0: >1: 1	

*L:M:N:O = 10:3:1:~0.3 sπ ce

J.M.Hollander, W.G.Smith, J.O.Rasmussen, Phys. Rev. 102, 1372 (1956).

Am^{242} 95 147 100^{y} g.s.

β^- 90% **0.585** *10* Am^{241}(n,γ) chem; sd

ϵ_K 10% scin Pu K x ray

No ce observed sd ce

45 ± 10% of β's to 0.042 Cm^{242} level from β(L x ray)/β

R.W.Hoff, H.Jaffe, T.O.Passell, F.S.Stephens E.K.Hulet, S.G.Thompson, Phys. Rev. 100, 1403 (1955).

Am^{242} 95 147 16^{h}

τ **16^{h}** Am^{241}(n,γ) chem

β^- ~49% **0.625** *5* $\Delta J = 2$, yes shape sd

~33% **0.667** *5* F-K assumed linear

ϵ (~18%) pc Pu K_α, K_β x rays

$\gamma(Cm^{242})$

		L_2 : L_3 : M : N	sd ce
559*	**0.0422**	222 : 163 : 120 : 54	E2

$\gamma(Am^{242})$

< 50*	**0.0451**		

$\gamma(Pu^{242})$

128*	**0.0445**	69 : 34 : 18 : 7	E2

*ce per 1000 β^-

S.A.Baranov, K.N.Shlyagin, Conf. Acad. Sci. USSR on Peaceful Use of Atomic Energy, Phys. Math. Sci. p. 251 July (1955); Consultants Bureau Trans. p. 183.

β^- 81%$ **0.620** *10* Am^{241}(n,γ) chem; sd

ϵ 19%$ Pu^{242}/Cm^{242}

$\gamma(Cm^{242})$ sd ce

100*	**0.0422** *3***	L_2/L_3 = 1.4 *4*	E2

$\gamma(Pu^{242})$

40*	**0.0446** *3***	L_2/L_3 = 1.4 *4*	E2

No IT (<6% from L x ray intensities) cryst

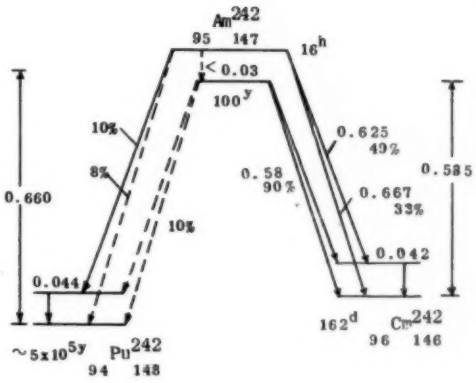
No IT γ with $E_\gamma > 0.030$ sd ce

51 ± 5% of β's to 0.042 Cm^{242} level from β (L x ray)/β

*Relative ce_L intensities

R.W.Hoff, H.Jaffe, T.O.Passell, F.S.Stephens, E.K.Hulet, S.G.Thompson, Phys. Rev. 100, 1403 (1955); $G.H.Higgins, S.G.Thompson, ibid.; **E.L.Church, ibid.

Am^{242} 95 147



Am^{243} 95 148

	ground state	
μ	+1.4	S
q	+4.9	

$\mu(Am^{241})/\mu(Am^{243})$ = +1.00 *1*

$q(Am^{241})/q(Am^{243})$ = +1.00 *1*

T.E.Manning, M.Fred, F.S.Tomkins, Phys. Rev. 102, 1108 (1956).

Am^{243} 95 148 8800^{y}

α(0.075 γ) delay < $2^{m\mu s}$

D.Strominger, J.O.Rasmussen, Phys. Rev. 100, 844 (1955).

Am^{244} 95 149 26^{m}

$\epsilon/\beta^- = 3.9 \times 10^{-4}$ Am^{243}(pile n,γ) chem; ms

From Pu^{244}, Cm^{244} yield

P.R.Fields, J.E.Gindler, A.L.Harkness, M.H. Studier, J.R.Huizenga, A.M.Friedman, Phys. Rev. 100, 172 (1955).

Am^{245} 95 150 2.0^{h}

τ **2.07^{h}** *2* Pu^{244}(pile n) chem

J.P.Butler, T.A.Eastwood, T.L.Collins, M.E. Jones, F.M.Rourke, R.P.Schuman, Phys. Rev. 103, 634; Bull. Am. Phys. Soc. 1, No. 4, 187 K4 (1956).

τ **2.08^{h}** *8* Pu^{239}(pile n) chem

β^- **0.905** *5* sl

$\gamma(Cm^{245})$

0.036 *5*		**0.140** *5*	scin $\gamma\gamma$
0.060 ?		**0.153** *5*	
0.078 ?		**0.230** *5*	
0.111* *5*		**0.255**$ *5*	
0.123 *5*			

α_K = 0.19 K/L = 5 E1 sl ce

(0.255 γ)(0.036, 0.06?, 0.078?, 0.11*, 0.12, 0.15 γ)

(0.230 γ)(0.036, 0.06?, 0.078?, 0.11*, 0.14 γ)

(0.11* γ)(0.11*, 0.14, 0.230, 0.255 γ) *K x ray?

C.I.Browne, D.C.Hoffman, W.T.Crane, J.P. Balagna, G.H.Higgins, J.W.Barnes, R.W.Hoff, H.L.Smith, J.P.Mize, M.E.Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).

Am^{245} 95 150 2.0h

τ	1.98h 2	d 2.0h	Pu chem
β^-	~0.86	a	
$\gamma(Cm^{245})$	0.121	scin	
	0.260		

P.R.Fields, M.H.Studier, A.M.Friedman, H. Diamond, R.Sjoblom, P.A.Sellers, J. Inorg. Nucl. Chem. 1, 262 (1955).

Am^{246} 95 151 25m

τ	25m	p~3000y	Cm chem

C.I.Browne, D.C.Hoffman, W.T.Crane, J.P. Balagna, G.H.Higgins, J.W.Barnes, R.W.Hoff, H.L.Smith, J.P.Mize, M.E.Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).

τ	25.0m 2	d 11d	Pu chem
β^-	1.222	scin $\beta(1.069\gamma)$	
w	>1.2	scin	
$\gamma(Cm^{246})$	~0.10 (K x ray ?)	$(1.069\gamma)\gamma$	
	~0.20		
	0.795	scin	
	1.069		
x	L x ray		

$(1.069\gamma)(1.22\beta, \sim 0.10, \sim 0.20\gamma)$

$(\sim 0.10\gamma)(1.069\gamma)/(\sim 0.10\gamma) = 0.04$

D.Engelkemeir, P.R.Fields, S.Fried, G.L.Pyle, C.M.Stevens, L.B.Asprey, C.I.Browne, H.L. Smith, R.W.Spence, J.Inorg. Nuclear Chem. 1, 345 (1955).

Cm^{242} 96 146 162d

$\gamma(Pu^{238})$	0.04411 5	$L_2/L_3 = 1.2$	$M_2/M_3 = 1.2$	$N_2/N_3 \sim 1$ sm ce
		$L:M:N = 26:10:3$		
	0.1019 3	$M_2/M_3 = 1.5$	$L/M \sim 3$	
		$L_1:L_2:L_3 = \sim 2:14:10$		
	0.1577 5			

W.G.Smith, J.M.Hollander, Phys. Rev. 101, 746 (1956).

$\gamma(Pu^{238})$	0.562	E1	scin
	0.605	E1	

E1 assignment from systematics

F.S.Stephens,Jr., F.Asaro, I.Perlman, Phys. Rev. 100, 1543 (1955).

Cm^{244} 96 148 18y

$\gamma(Pu^{240})$	0.04288 5	$L_2/L_3 = 1.0$	$M_2/M_3 = 1.0$	$N_2/N_3 \sim 1$ sm ce
		$L:M:N = 25:10:3$		

W.G.Smith, J.M.Hollander, Phys. Rev. 101, 746 (1956).

Cm^{245} 96 149 .4 x 10^4y

τ	1.43×10^4y 29	d 2.0h	Am chem

C.I.Browne, D.C.Hoffman, W.T.Crane, J.P. Balagna, G.H.Higgins, J.W.Barnes, R.W.Hoff, H.L.Smith, J.P.Mize, M.E.Bunker, J. Inorg. Chem. 1, 254 (1955).

τ	2300y 460	d 25m	Am chem

C.I.Browne, D.C.Hoffman, W.T.Crane, J.P. Balagna, G.H.Higgins, J.W.Barnes, R.W.Hoff, H.L.Smith, J.P.Mize, M.E.Bunker, J. Inorg. Nucl. Chem. 1, 254 (1955).

Cm^{246} 96 150 ~3000y

Pu(pile n)Cf chem

τ_a	6600y 300	
α	5.373 10	ic

τ from relative disintegration rates of Cf^{250} and Cm^{246} and $\tau = 9.3^y$ for Cf^{250}

J.P.Butler, T.A.Eastwood, H.G.Jackson, R.P. Schuman, Phys. Rev. 103, 965 (1956).

H-bomb debris chem

τ for spontaneous fission 2.0×10^{7y} 8

S.M.Fried, G.L.Pyle, C.M.Stevens, J.R. Huizenga, J.Inorg. Nuclear Chem. 2, 415 (1956).

α	5.4	H-bomb debris chem, ms	ic

P.R.Fields, M.H.Studier, H.Diamond, J.F.Mech, M.G.Inghram, G.L.Pyle, C.M.Stevens, S.Fried, W.M.Manning, A.Ghiorso, S.G.Thompson, G.H. Higgins, G.T.Seaborg, Phys. Rev. 102, 180 (1956).

Cm^{248} 96 152 4.7×10^5y

Pu(pile n)Cf chem

τ_a	4.7×10^{5y} 4	
α	5.054 15	ic

τ from relative disintegration rates of Cf^{252} and Cm^{248} and $\tau = 2.2^y$ for Cf^{252}

τ for spontaneous fission = 4.6×10^{6y} 5

J.P.Butler, T.A.Eastwood, H.G.Jackson, R.P. Schuman, Phys. Rev. 103, 965 (1956).

Cm^{249} 96 153 65m

τ	65m	Cm(pile n)
β^-	0.9	

P.R.Fields, M.H.Studier, H.Diamond, J.F.Mech, M.G.Inghram, G.L.Pyle, C.M.Stevens, S.Fried, W.M.Manning, A.Ghiorso, S.G.Thompson, G.H. Higgins, G.T.Seaborg, Phys. Rev. 102, 180 (1956).

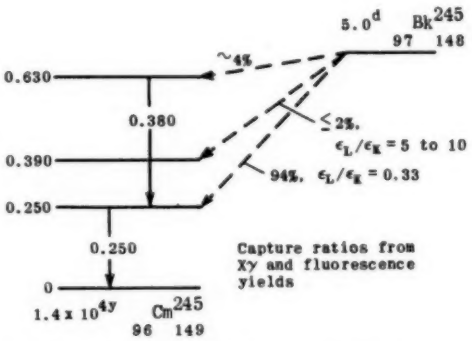
Cm^{250} 96 154 — τ_β >130^y
From absence of Cf^{250} in H-bomb debris

P.R.Fields, M.H.Studier, H.Diamond, J.F.Mech, M.G.Inghram, G.L.Pyle, C.M.Stevens, S.Fried, W.M.Manning, A.Ghiorso, S.G.Thompson, G.H. Higgins, G.T.Seaborg, Phys. Rev. 102, 180 (1956).

Bk^{245} 97 148 — 5.0^d

τ		4.98^d 2		Cm^{244}(d,n), $Am^{243}(\alpha,2n)$ chem
α	0.22†	5.89 2		ic
	0.34†	6.17 2		
	0.28†	6.37 2		
$\gamma(Cm^{245})$				scin,sl ce
	245†	0.250	α_K = 1.76 8	α_L = 0.44
	40†	0.380	ce_K/γ = 0.2 (double?)	
x	620†	L x ray		
	1000†	K x ray		

(0.25 γ)(0.38γ, K x ray, L x ray)
(K x ray)(E_γ > 0.05) delay < 2$^{m\mu s}$
No 0.068γ No γ with E_γ > 0.46 (<2†)



L.B.Magnusson, A.M.Friedman, D.Engelkemeir, P.R.Fields, F.Wagner,Jr., Phys. Rev.102 1097 (1956).

Bk^{248} 97 151 — 23^h — τ 23^h 5 — Cm(25-Mev α) chem
From milking of 250^dCf^{248}(6.3 α observed)

E.K.Hulet, Phys. Rev. 102, 182 (1956).

Cf^{244} 98 146 — 25^m — τ 25^m 3 — $Cm^{242}(\alpha,2n)$ chem
α 7.17 2 — ic
p 27^{d}Cm
Relative yields of 7.17α, 7.11α consistent with assignment to Cf^{244},Cf^{245} respectively

A.Chetham-Strode,Jr., G.R.Choppin, B.G.Harvey, Phys. Rev. 102, 747(1956).

Cf^{245} 98 147 — 45^m — $Cm^{244}(\alpha,3n)$ chem
α 7.11 2 — ic
α/ϵ~30/70 from growth of 5.0^dBk^{245}
Bases of mass assignment: Relative yields of 7.17α, 7.17α(see Cf^{244}); not parent of 27^{d}Cm (insufficient growth of 6.26α); $\alpha x_L/\alpha$ < 2%
45^{m}Cf previously assigned to Cf^{244}

A.Chetham-Strode,Jr., G.R.Choppin, B.G.Harvey, Phys. Rev. 102, 747 (1956).

Cf^{249} 98 151 — ~470^y — $\gamma(Cm^{245})$ — d Bk^{249} chem — scin $\alpha\gamma$

16†	0.340	
60†	0.395	

α(0.340, 0.395γ)
†Photons per 100 α's

F.Asaro, F.S.Stephens, Jr., B.G.Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).

Cf^{250} 98 152 — 10^y — α 17% 5.980; 83% 6.024 5 — Cm^{244}(pile n); s

F.Asaro, F.S.Stephens, Jr., B.G.Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).

α 6.025 5 — Pu(n) chem

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, KAPL-1378 (1955).

Cf^{251}? 98 153 — >18^d — $\gamma(Cm^{247}$?) 0.180 — scin $\alpha\gamma$

F.Asaro, F.S.Stephens, Jr., B.G.Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).

Cf^{252} 98 154 — 2.2^y — α 15.5% 6.069; 84.5% 6.112 5 — Cm^{244}(pile n); s
$\gamma(Cm^{248})$ — scin $\alpha\gamma$

14†	0.042	α = 1100	E2
13†	0.100		

α(0.042, 0.100γ)
†Photons per 10^5 α's

F.Asaro, F.S.Stephens, Jr., B.G.Harvey, I. Perlman, Phys. Rev. 100, 137 (1955).

α 6.119 5 — Pu(n) chem
α/fission = 38.0 7

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, KAPL-1378 (1955).

$Cf^{254}_{98\ 156}$ 55^d

τ **55^d** H-bomb debris chem

Decays by spontaneous fission

P.R.Fields, M.H.Studier, H.Diamond, J.F.Mech, M.G.Inghram, G.L.Pyle, C.M.Stevens, S.Fried, W.M.Manning, A.Ghiorso, S.G.Thompson, G.H. Higgins, G.T.Seaborg, Phys. Rev. 102, 180 (1956).

$E^{253}_{99\ 154}$ 20^d

τ		**20.03^d** *1*		Pu(pile n) chem
α	~0.08%	**6.24** *2*		ic
	100%	**6.636** *5*		
$\gamma(Bk^{249})$				scin
	3.8†	**0.042** *3*	α_L~34 (ω_L = 0.50)	x/γ
	5.5†	**0.393** *5*	α_K~0.66	x/γ
x	65†	**L x ray**		
	3.6†	**K x ray**		

(6.24 α)(0.393 γ)

τ for spontaneous fission = 7 x 10^{5y} *3*

†Photons per 10^4 α's

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, Phys. Rev. 102, 203 (1956).

$E^{254}_{99\ 155}$ ~320^d s.s.

τ		**~320^d**	Pu(pile n) chem
α		**6.42** *2*	ic
p $3^h Bk^{250}$			recoil

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, Phys. Rev. 102, 203 (1956).

$E^{254}_{99\ 155}$ 38^h

τ		**38.5^h** *10*	Pu(pile n) chem
β^-		**1.04** *4*	a
$\gamma(Fm^{254})$			
	~70†	**0.660** *15*	scin

†Photons per 100 β's

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, Phys. Rev. 102, 203 (1956).

$E^{255}_{99\ 156}$ 24^d

τ **24^d** *2* Pu(pile n) chem

p $22^h Fm^{255}$ (α pulse analysis)

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, Phys. Rev. 102, 203 (1956).

$Fm^{252}_{100\ 152}$ 23^h

τ		**22.7^h** *7*	Cf(34-Mev α) chem
α		**7.04** *2*	ic

p $250^d Cf^{248}$ (from increase of 6.3 α)

τ for spontaneous fission > 3000^d

A.M.Friedman, J.E.Gindler, R.F.Barnes, R. Sjoblom, P.R.Fields, Phys. Rev. 102, 585 (1956).

$Fm^{253?}_{100\ 153}$ >10^d

τ		**>10^d**	Cf(34-Mev α) chem
α		**6.85**	ic

A.M.Friedman, J.E.Gindler, R.F.Barnes, R. Sjoblom, P.R.Fields, Phys. Rev. 102, 585 (1956).

$Fm^{254}_{100\ 154}$ 3.2^h

τ		**3.24^h** *1*	Pu(pile n) chem
α		**7.20** *1*	ic

τ for spontaneous fission = 246^d

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, Phys. Rev. 102, 203 (1956).

$Fm^{255}_{100\ 155}$ 22^h

τ		**21.5^h** *1*	Pu(pile n) chem
α		**7.08** *1* double ?	ic

M.Jones, R.P.Schuman, J.P.Butler, G.Cowper, T.A.Eastwood, H.G.Jackson, Phys. Rev. 102, 203 (1956).

2. NEUTRON CROSS SECTIONS

Absorption cross sections for neutron energies marked "th" (thermal) have been determined, from measurements in a thermal neutron flux, in terms of the cross section value of a "standard" for neutrons of velocity 2200 m/sec, or energy ~ 0.025 ev. The standard used, when clearly stated by the experimenter, is given just after the reference and is generally one known to have a thermal absorption cross section with 1/v energy dependence. If the nucleus whose cross section is being measured also has a cross section with 1/v dependence, the cross section found for it by comparison with the standard will, of course, be a cross section for 2200 m/sec. If not, and the dependence often is not known, the value found by the comparison is $\overline{\sigma v}/2200$.

Cross sections for inelastic scattering are given in a way which indicates the experimental method used. For instance, "n, 2.00n′ (90°)" in the "Type of σ" column, means that the cross section given is for the production of 2.00-Mev neutrons at 90° to the incident beam (in barns per steradian) and that these neutrons were observed experimentally. The energy of the incoming neutrons is given in the column headed "Energy". If it is 2.45 Mev, the energy loss in the inelastic process was 0.45 Mev. If the σ type is shown as "n,n′ + 1.00γ(90°) the cross section given is for the production of 1.00-Mev γ's In this case γ's, not neutrons, were observed at 90°. The energy lost by the neutron is then 1.00 Mev or more depending on whether or not another γ ray, unobserved in the experiment, was in cascade with the 1.00-Mev γ.

Target	Neutron Energy	Type of σ	Value of σ or $\int\sigma d\Omega$	Method	Ref.
H	th	n,γ	**0.335** *4*	mean life	56M62
	380	t	**0.034** *2*		55D46
	500	t	**0.035** *2*		55D46
	590	t	**0.036** *2*		55D46
	630	t	**0.037** *4*		55D46
H^2	380	t	**0.057** *2*		55D46
	500	t	**0.065** *2*		55D46
	590	t	**0.072** *2*		55D46
	630	t	**0.077** *5*		55D46
He^3	0.120 to 1	n,p	**graph**	He^3 pc	55B146
	0.20 to 22	t	**graph**		56C44
Li	4.4 to 5.5 7.8 to 8.6 }	t	**graphs**		56B62
Li^6	0.2 to 0.3	el(θ)	**graphs**	pc	56W04
	0.88 to 6.52	n,α	**table**	pc	56R34
Li^7	0.2 to 0.6	el(θ)	**graphs**	pc	56W04
Be^9	2.56 2.74 }	n,n′γ(95°) No 1.8,2.2γ observed	**<0.1 mb**	scin γ	56D23
	4.4 to 5.5 7.8 to 8.6 }	t	**graphs**		56B62
	12.7	t-el	**0.49** *8*	sphere	55T26
	14.1	t-el	**0.37** *8*	sphere	55T26
	380	t	**0.233** *4*		55D46
	500	t	**0.249** *3*		55D46
	590	t	**0.261** *4*		55D46
	630	t	**0.274** *4*		55D46
B	th	n,γ	**761**° *2*	mean life	56C45
	th	n,γ	**760**^{h} *3*	mean life	56C45
	o, Oxford sample				
	h, Harwell standard			Cf NSA 9 24B,p 131	
	4.4 to 5.5 7.8 to 8.6 }	t	**graphs**		56B62
B^{10}	2.56	n,n′+0.72γ(95°)	**0.0025** *2*	scin γ	56D23
	4.4 to 5.5 7.8 to 8.6 }	t	**graphs**		56B62
	14	n,t2α	**0.102** *17*	ppl	56F18
	14	n,dn′2α	**0.128** *19*	ppl	56F18
$B^{(11)}$	2.59	n,n′+2.14γ(90°)	**0.025**	scin γ	56D01
B^{11}	12.6 to 20.0	n,$\alpha\beta$2α	**graph**	ppl	56A21
C	4.4 to 5.5 7.7 to 8.6 }	t	**graphs**		56B62
	12.7	t-el	**0.56** *10*	sphere	55T26
	14.1	t-el	**0.51** *8*	sphere	55T26
	55	t-el	**0.28** *3*	"sphere"	56V11
	81	t-el	**0.20** *2*	"sphere"	56V11
	105	t-el	**0.234** *8*	"sphere"	56V11
	140	t-el	**0.22** *1*	"sphere"	56V11
	380	t	**0.286** *2*		55D46
	500	t	**0.306** *2*		55D46
	590	t	**0.319** *2*		55D46
	630	t	**0.338** *5*		55D46
$C^{(12)}$	6.58	n,n′+4.4γ(95°)	**0.028** *5*	scin γ	56D23
	7.87	n,n′+4.4γ(90°)	**0.060**	scin γ	56H15
N	4.4 to 5.5 7.8 to 8.6 }	t	**graphs**		56B62
$N^{(14)}$	th	n,γ	**0.080** *20*	sm pr	56C04
	3.95	n,n′+2.3γ(95°)	**0.0005** *3*	scin γ	56D23
O	4.4 to 5.5 7.7 to 8.6 }	t	**graphs**		56B62
	380	t	**0.376** *6*		55D46
	500	t	**0.398** *4*		55D46
	590	t	**0.407** *5*		55D46
	630	t	**0.422** *9*		55D46
$O^{(16)}$	7.06	n,n′+6.1γ(95°)	**0.0082** *2*	scin γ	56D23

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
F^{19}	2.45	n, 0.99n′(90°)	0.023	3	pulsed	56C31
	2.45	n, 0.89n′(90°)	0.023	3	VdG	56C31
	2.56	n,n′+0.11γ(95°)	0.015	3	scin γ	56D23
	2.56	n,n′+0.20γ(95°)	0.043	6	scin γ	56D23
	2.56	n,n′+1.23γ(95°)	0.004	1	scin γ	56D23
	2.56	n,n′+1.36γ(95°)	0.024	2	scin γ	56D23
	2.56	n,n′+1.46γ(95°)	0.005	1	scin γ	56D23
	2.56	n,n′+1.56γ 95°)	0.002	1	scin γ	56D23
	3.1 to 8.0	n,α	graph		$7.4^{s}N$	55M86
	4.4 to 5.5	t	graph			56B62
	4.7 to 8.0	n,p	graph		$29^{s}O$	55M86
Na^{23}	0.80	n,n′+0.44γ(100°)	0.087	12	scin γ	56M54
	2.45	n, 2.01n′(90°)	0.050	10	pulsed VdG	56C31
Mg	2.45	n, 1.07n′(90°)	0.024	2	pulsed VdG	56C31
Mg^{24}	0.085	t	60			56T01
$Mg^{(24)}$	2.56	n,n′+1.37γ(95°)	0.049	4	scin γ	56D23
	12.5 to 17.5	n,p	graph		$15^{h}Na$	56C22
$Mg^{(25)}$	2.56	n,n′+1.61γ(95°)	0.015	3	scin γ	56D23
Mg^{26}	pile	n,γ	0.025	2	$9.5^{m}Mg$	56L06
$Mg^{(26)}$	2.56	n,n′+1.83γ(95°)	0.012	2	scin γ	56D23
Al^{27}	1.75 to 7	t-el	table		sphere	56B49
	2.45	n, 1.43n′(90°)	0.020	2	pulsed VdG	56C31
	2.56	n,n′+0.17γ(95°)	0.00013	3	scin γ	56D23
	2.56	n,n′+0.84γ(95°)	0.0051	6	scin γ	56D23
	2.56	n,n′+1.02γ(95°)	0.011	1	scin γ	56D23
	2.56	n,n′+2.2γ(95°)	0.0069	7	scin γ	56D23
	3.5 to 14.1	t-el	table		sphere	55T26
	3.6	n,n′+2.2γ(100°)	0.056	11	scin γ	56M54
	3.7	n,n′+0.84γ(90°)	0.022		scin γ	55R38
	3.7	n,n′+1.02γ(90°)	0.041		scin γ	55R38
	3.7	n,n′+2.2γ(90°)	0.013		scin γ	55R38
	13.0 to 16.2	t	graph			56M51
	14	n,p and n,d	0.13		ppl	56H01
	55	t-el	0.50	4	"sphere"	56V11
	81	t-el	0.41	3	"sphere"	56V11
	105	t-el	0.43	1	"sphere"	56V11
	140	t-el	0.42	1	"sphere"	56V11
	380	t	0.582	8		55D46
	500	t	0.612	4		55D46
	590	t	0.631	9		55D46
	630	t	0.645	7		55D46
Si	3.7	n,n′+1.78γ(90°)	0.064		scin γ	55R38
Si^{28}	4.4 to 8.0	n,p	graph		$2.3^{m}Al$	56M06
$Si^{(28)}$	12.5 to 17.5	n,p	graph		$2.3^{m}Al$	56C22
P^{31}	1.2	n,n′+0.4γ	<0.05		scin γ	56V02
	1.2	n,n′+0.9γ	<0.15		scin γ	56V02
	2.45	n, 1.20n′(90°)	0.051	7	pulsed VdG	56C31
S	14	el(θ)	graph		scin n	56E03
$S^{(32)}$	2.56	n,p′+0.077γ(95°)	0.0010	2	scin γ	56D23
	2.56	n,n′+2.2γ(95°)	0.014	1	scin γ	56D23
	3.7	n,n′+2.2γ(100°)	0.036	7	scin γ	56M54

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
Cl	0.03 ev	t	44			56B35
	5 kev	t	1.3			56B35
$Cl^{(37)}$	12.5 to 17.5	n,p	graph		$5.0^{m}S$	56C22
A	0.07 ev	t	0.96			56H08
	0.07 ev	s	0.61			56H08
A^{36}	0.07 ev	t	75	9		56H08
A^{40}	0.07 ev	s	0.36			56H08
$Ca^{(40)}$	3.95	n,p′+0.03γ(95°)	0.010	5	scin γ	56D23
	3.95	n,p′+0.77γ(95°)	0.006	1	scin γ	56D23
	3.95	n,p′+0.88γ(95°)	0.0006	3	scin γ	56D23
	3.95	n,n′+γ±(95°)	0.008	1	scin γ	56D23
	3.95	n,n′+3.7γ(95°)	0.006	2	scin γ	56D23
	3.95	n,n′+3.9γ(95°)	0.003	1	scin γ	56D23
$Ca^{(44)}$	3.95	n,n′+1.16γ(95°)	0.090	24	scin γ	56D23
Ti	1.75 to 7	t-el	table		sphere	56B49
	3.5 to 14.1	t-el	table		sphere	55T26
$Ti^{(48)}$	2.25	n, 1.22n′(90°)	0.075	4	pulsed	56C31
	2.45	n, 1.46n′(90°)	0.085	3	VdG	56C31
V	2.45	n, 1.53n′(90°)	0.016	1	pulsed	56C31
	2.45	n, 0.82n′(90°)	0.018	2	VdG	56C31
Cr	2.45	n, 0.96n′(90°)	0.048	3	pulsed VdG	56C31
	2.50	n, 1.05n′	0.6	2	scin n	56B40
	3.5 to 14.1	t-el	table		sphere	55T26
	4.4	el(90°)	0.037	7	ppl	56W02
	4.4	t(90°)	0.066	17	ppl	56W02
Mn^{55}	175 to 10^4 ev	t	graph			55B115
	0.1 to 2.0	n,n′+0.13γ	graph		scin γ	56G15
	0.65	n,n′+0.13γ(90°)	0.59	10	scin γ	56V02
	1.2	n,n′+0.85γ(90°)	0.15	6	scin γ	56V02
	2.45	n, 1.47n′(90°)	0.020	2	pulsed	56C31
	2.45	n, 1.17n′(90°)	0.011	1	VdG	56C31
	2.45	n, 0.92n′(90°)	0.012	2		56C31
	2.50	n, 1.56n′	0.4		scin n	56B40
	2.50	n, 1.13n′	0.3		scin n	56B40
	2.50	n, 0.85n′	0.1		scin n	56B40
Zn	2.45	n, 1.37n′(90°)	0.062	4	pulsed VdG	56C31
	2.5	t-el	1.30		sphere	56B49
	7	t-el	1.61		sphere	56B49
	13.0 to 16.2	t	graph			56M51
$Zn^{(64)}$	12.5 to 17.5	n,2n	graph		$38^{m}Zn$	56C22
Zn^{64}	14	n,p and n,np	0.590	75	ppl	56R29
$Zn^{(68)}$	14	n,α	0.0082	16	$2.6^{h}Ni$	56B50
As^{75}	2.45	n, 1.67n′(90°)	0.027	6	pulsed	56C31
	2.45	n, 1.20n′(90°)	0.047	8	VdG	56C31
	2.45	n, 0.82n′(90°)	0.021	3		
Se	1 to 10^3 ev	t	graph			55B115
	1 to 80kev	t	graph			56N07
	2.45	n, 1.79n′(90°)	0.064	8	pulsed	56C31
	2.45	n, 0.95n′(90°)	0.043	5	VdG	56C31

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
$Br^{(79)}$	14	n,α	**0.010**	2	26.5^{h}As	56B50
Kr	th	s coh	**7.4**	4	liquid mirror	56C30
Sr	6 to 102kev	t	**graph**			56N07
	~1	No n,n′γ	**<0.26**		scin γ	56V02
$Sr^{(84)}$	pile	n,γ	**1.6**	1	65^{d}Sr	56A16
$Sr^{(88)}$	12.5 to 17.5	n,p	**graph**		18^{m}Rb	56C22
Y^{89}	0.8 to 1.8	n,n′+0.91γ	**graph**		scin γ	55S92
Y^{90}	th	n,γ	**<6.5**		57^{d}Y	55S96
Zr	2 to 80kev	t	**graph**			56N07
	0.7 to 1.2	t	**graph**			56G05
	0.9 to 2.2	n,n′+0.93γ	**graph**		scin γ	56G05
	1.75 to 7	t-el	**table**		sphere	56B49
	2.45	n,1.52n′(90°)	**0.023**	2	pulsed VdG	56C31
	2.56	n,n′+2.17γ(90°)	**0.22**		scin γ	56D01
	2.56	n,n′+0.93γ(90°)	**0.05**		scin γ	56D01
$Zr^{(90)}$	14	n,α	**0.0033**	6	2.8^{h}Sr	55B136
Zr^{92+94}	1 to 5.5	n,n′+0.93γ	**graph**		scin γ	56G41
$Zr^{(94)}$	14	n,α	**0.0036**	5	9.7^{h}Sr	55B136
Nb^{93}	14	n,α	**0.0090**	22	64^{h}Y	56B50
Mo	1 to 80kev	t	**graph**			56N07
	2.45	n,1.62n′(90°)	**0.042**	4	pulsed VdG	56C31
	2.45	n,0.89n′(90°)	**0.052**	4		56C31
	4.4	el(90°)	**0.036**	9	ppl	56W02
	4.4	t(90°)	**0.076**	20		56W02
Mo^{98}	pile	n,γβ$^-$	**0.13**		6.0^{h}Tc	56B65
Tc^{98}	pile	n,γ	**≤1**		6.0^{h}Tc	56B65
Tc^{99}	th	a	**19**	2	osc	55P49
	pile	n,n′	**~0.05**		6.0^{h}Tc	56B65
Ru^{99}	pile	n,p	**5×10^{-5} or (5×10^{-3})**		6.0^{h}Tc	56B65
Pd	14	t	**4.30**	10		56H42
$Pd^{(108)}$	14	n,α	**0.0023**	5	4.4^{h}Ru	56B50
Ag	2.5	t-el	**2.07**		sphere	56B49
	3.5 to 14.1	t-el	**table**		sphere	55T26
	7	t-el	**2.00**		sphere	56B49
	~12.5	t	**4.38**			56M51
	13.0 to 16.2	t	**graph**			56M51
Cd	~1 to 2000ev	t	**graph**			56P15
	1.2	t-el	**1.0**		sphere	56M63
	1.6	t-el	**1.3**		sphere	56M63
	1.75 to 7	t-el	**table**		sphere	56B49
	2.0	t-el	**1.7**		sphere	56M63
	2.45	n,1.81n′(90°)	**0.040**	5	pulsed VdG	56C31
	2.45	n,1.09n′(90°)	**0.031**	4		56C31
	2.45	n,0.96n′(90°)	**0.031**	4		56C31
	14	t	**4.37**	10		56H42
	55	t-el	**1.55**	2	"sphere"	56V11
	81	t-el	**1.25**	5	"sphere"	56V11
	105	t-el	**1.20**	3	"sphere"	56V11
	140	t-el	**1.07**	2	"sphere"	56V11

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
In	14	el(θ)	**graph**		scin n	56E03
$In^{(115)}$	14	n,α	**0.0020**	4	3.2^{h}Ag	56B50
Sn	1.75 to 7	t-el	**table**		sphere	56B49
	2.45	n,1.21n′(90°)	**0.047**	3	pulsed VdG	56C31
	3.5 to 14.1	t-el	**table**		sphere	55T26
	13.0 to 16.2	t	**graph**			56M51
	14.0	t	**4.70**			56M51
Fe	1 to 120kev	t	**graph**			56G32
	1.2	t-el	**0.5**		sphere	56M63
	1.6	t-el	**0.7**		sphere	56M63
	2.0	t-el	**1.0**		sphere	56M63
	1.67	el/inel (45°) =	**2.7**	2	scin n	55B137
	1.67	el/inel (90°) =	**0.7**	1	scin n	55B137
	1.67	el/inel(135°) =	**1.6**	2	scin n	55B137
	1.75 to 7	t-el	**table**		sphere	56B49
	2.56	n,n′+2.18γ(95°)	**0.0004**	1	scin γ	56D23
	2.56	n,n′+2.3γ (95°)	**0.0002**	1	scin γ	56D23
	3.5 to 14.1	t-el	**table**		sphere	55T26
	3.7 to 5.0	n,n′+0.84γ(100°)	**graph**		scin γ	56M54
	3.7	n,n′+1.25γ(100°)	**0.024**	5	scin γ	56M54
	3.7	n,n′+1.80γ(100°)	**0.025**	5	scin γ	56M54
	3.7	n,n′+2.06γ(100°)	**0.030**	6	scin γ	56M54
	3.7	n,n′+2.57γ(100°)	**0.007**	1	scin γ	56M54
	3.7	n,n′+3.07γ(100°)	**0.014**	3	scin γ	56M54
	3.7	n,n′+3.44γ(100°)	**0.021**	4	scin γ	56M54
	3.7	n,n′+0.84γ(90°)	**0.135**		scin γ	55R38
	3.7	n,n′+1.80γ(90°)	**0.024**		scin γ	55R38
	6.5	el(90°)	**0.013**	3	ppl	56W02
	6.5	t(90°)	**0.061**	17		56W02
	13.0 to 16.2	t	**graph**			56M51
	14	el(θ)	**graph**		scin n	56E03
$Fe^{(54)}$	2.56	n,n′+1.41γ(95°)	**0.064**	7	scin γ	56D23
$Fe^{(56)}$	0.8 to 1.8	n,n′+0.84γ(90°)	**graph**		scin γ	56V02
	1 to 5.5	n,n′+0.84γ	**graph**		scin γ	56G41
	2.45	n,1.61n′(90°)	**0.085**	3	pulsed VdG	56C31
	2.56	n,n′+0.84γ(95°)	**0.074**	6	scin γ	56D23
	2.56	n,n′+1.24γ(95°)	**0.0037**	5	scin γ	56D23
$Fe^{(57)}$	2.56	n,n′+0.12γ(95°)	**0.043**	7	scin γ	56D23
Co^{59}	2.45	n,1.25n′(90°)	**0.038**	5	pulsed VdG	56C31
	2.45	n,0.94n′(90°)	**0.034**	4		56C31
	2.45	n,0.70n′(90°)	**0.012**	2		56C31
	14	n,α	**0.031**	3	2.6^{h}Mn	56B50
Ni	2.45	n,1.1n′(90°) n,0.9n′(90°)	**0.052**	3	scin n	56C31
	3.5 to 14.1	t-el	**table**		sphere	55T26
	13.0 to 16.2	t	**graph**			56M51
$Ni^{(58)}$	pile	n,p	**0.030**	3	72^{d}Co	56R01
	2.56	n,n′+1.45γ(95°)	**0.045**	4	scin γ	56D23
$Ni^{(60)}$	pile	n,p	**<0.6**	1 mb	5.2^{y}Co	56R01
	2.56	n,n′+0.85γ(95°)	**0.017**	3	scin γ	56D23
	2.56	n,n′+1.33γ(95°)	**0.055**	6	scin γ	56D23
	2.56	n,n′+2.18γ(95°)	**0.005**	2	scin γ	56D23

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
Cu	th	a	3.78	5	osc	56B80
	1.2	t-el	0.5		sphere	56M63
	1.6	t-el	0.7		sphere	56M63
	2.0	t-el	1.1		sphere	56M63
	2.45	n, 1.47n′(90°)	0.038	5	pulsed VdG	56C31
	2.45	n, 0.99n′(90°)	0.032	4	pulsed VdG	56C31
	2.45	n, 0.83n′(90°)	0.013	3	pulsed VdG	56C31
	2.45	n, 0.71n′(90°)	0.009	2	pulsed VdG	56C31
	2.45	n, 0.55n′(90°)	0.007	2	pulsed VdG	56C31
	2.56	n,n′+0.76γ(95°)	0.004	1	scin γ	56D23
	2.56	n,n′+2.07γ(95°)	0.0029	6	scin γ	56D23
	3.5 to 14.1	t-el	table		sphere	55T26
	13.0 to 16.2	t	graph			56M51
	55	t-el	1.12	1	"sphere"	56V11
	81	t-el	0.84	4	"sphere"	56V11
	105	t-el	0.77	1	"sphere"	56V11
	140	t-el	0.74	1	"sphere"	56V11
	380	t	1.17	3		55D46
	500	t	1.21	2		55D46
	590	t	1.25	4		55D46
	630	t	1.31	3		55D46
$Cu^{(63)}$	2.56	n,n′+0.68γ(95°)	0.082	2	scin γ	56D23
	2.56	n,n′+0.97γ(95°)	0.042	5	scin γ	56D23
	2.56	n,n′+1.33γ(95°)	0.013	2	scin γ	56D23
	2.56	n,n′+1.41γ(95°)	0.007	2	scin γ	56D23
	2.56	n,n′+1.55γ(95°)	0.006	1	scin γ	56D23
	2.56	n,n′+1.88γ(95°)	0.003	1	scin γ	56D23
	2.56	n,n′+2.52γ(95°)	<0.0003		scin γ	56D23
	12.5 to 17.5	n,2n	graph		$10^{m}Cu$	56C22
$Cu^{(65)}$	2.56	n,n′+0.37γ(95°)	0.012	2	scin γ	56D23
	2.56	n,n′+1.11γ(95°)	0.043	5	scin γ	56D23
	2.56	n,n′+1.5γ (95°)	0.008	4	scin γ	56D23
	380	t	1.88	4		55D46
	500	t	1.93	3		55D46
	590	t	1.98	4		55D46
	630	t	2.03	4		55D46
Sb	3.7	n,n′+1.00γ(90°)	0.075		scin γ	55R38
Te	2.45	n, 1.73n′(90°)	0.055	6	pulsed VdG	56C31
I^{127}	~25 kev	n,γ	0.82	6	$25^{m}I$	56M33
	0.1 to 1.2	n,n′+0.06γ	graph		scin γ	56G15
	0.40	n,n′+0.06γ	0.30	5	scin γ	56V02
	0.65	n,n′+0.21γ	0.31	8	scin γ	56V02
	1.18	n,n′+0.43γ	0.44	12	scin γ	56V02
	1.18	n,n′+0.63γ	0.59	10	scin γ	56V02
I^{129}	pile	n,γ	35		$12.5^{h}I$	56P25
Xe	th	s coh	3.3	2	liquid mirror	56C30
Xe^{135}	0.015 to 0.2ev	t	graph			56B86
	pile	n,γ	2.58×10^{6}	20		
			$9.2^{h}Xe$ depletion			56F19
Cs^{133}	14	n,α	0.0010	3	$12.5^{h}I$	56B50
Ba	15 to 102kev	t	graph			56N07
$Ba^{(132)}$	pile	n,p	0.7	2 mb	$6.2^{d}Cs$	56R01
$Ba^{(136)}$	pile	n,p	0.20	5 mb	$13^{d}Cs$	56R01
Ba^{137}	0.5 to 3.0	n,n′+0.66γ	graph		scin γ	55S92
Ce	5 to 55kev	t	graph			56N07
Ce^{136}	pile	n,γ	6.3		$8.7^{h}Ce$	56B93
	pile	n,γ	0.6		$34.5^{h}Ce$	56B93
Ce^{138}	pile	n,γ	0.007^{+7}_{-3}		$55^{s}Ce$	56K23
	pile	n,γ	$\sim 1^{+1}_{-0.5}$		$140^{d}Ce$	56K23
$Ce^{(142)}$	pile	n,γ	0.95	5	$14^{d}Pr$	56R36
$Ce^{(143)}$	pile	n,γ	6.0	7	$17.5^{m}Pr$	56R25
Pr^{142}	th	n,γ	18	3	$14^{d}Pr$	55S96
Nd	14	t	5.08	10		56H42
Sm	14	t	5.12	10		56H42
Tm^{169}	0.0253ev	t	134	3		56E08
Hf	0.5 to 7.0ev	t	graph			56I01
	0.3 to 2.0	n,n′+~0.23γ	graph		scin γ	56G15
	14	t	5.44	10		56H42
Ta^{181}	0.1 to 1.8	n,n′+0.14γ	graph		scin γ	56G15
	2.56	n,n′+0.14γ(95°)	0.036	5	scin γ	56D23
	2.56	n,n′+0.16γ(95°)	0.019	3	scin γ	56D23
	2.56	n,n′+0.35γ(95°)	0.011	3	scin γ	56D23
	2.56	n,n′+0.48γ(95°)	0.068	9	scin γ	56D23
	14	t	4.96	10		56H42
	14	el(θ)	graph		scin n	56E03
	14.1	n(5 to 12 Mev)n′	0.20		ppl	56A15
W	0.3 to 1.8	n,n′+~0.12γ	graph		scin γ	56G15
	380	t	2.69	4		55D46
	500	t	2.73	3		55D46
	590	t	2.78	6		55D46
	630	t	2.82	5		55D46
Re	1.0 to 2.5ev	t	graphs			55I09
	0.1 to 1.9	n,n′+~0.13γ	graph		scin γ	56G15
Ir	0.5 to 6.2	t	graphs			55L55
Pt	0.3 to 1.8	n,n′+~0.33γ	graph		scin γ	56G15
Au^{197}	0.0253ev	a	99.3	5	1/v line	56H07
	0.0253ev	a	99.0	20	1/v line	55G64
	0.3 to 1.6	n,n′+~0.28γ	graph		scin γ	56G15
	1.75 to 7	t-el	table		sphere	56B49
	14	n, >7Mev p	~0.11		ppl	56P02
	14	n, ~13Mev p	0.04		ppl	56P02
Au^{198}	th	n,γ	26×10^{3}	1	$3.16^{d}Au$	55B142
	pile	n,γ	26×10^{3}	1	S	55B101
Au^{199}	th	n,γ	$<3 \times 10^{3}$		$48^{m}Au$	55B142
Hg	13.0 to 16.2	t	graph			56M51
	15.7	t	5.50			56M51
Hg^{199}	0.6 to 1.0	n,n′+44^{m}Hg	graph		scin γ	55S92

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
Pb	2 to 80kev	t	graph			56N07
	1.2	t-el	0.4		sphere	56M63
	1.6	t-el	0.6		sphere	56M63
	2.0	t-el	1.0		sphere	56M63
	3.4	el(θ)	graph		scin n	55B110
	3.5 to 14.1	t-el	table		sphere	55T26
	10	t-el	2.58		sphere	56B79
	13.0 to 16.2	t	graph			56M51
	15.4	t	5.58			56M51
	55	t-el	2.34	2	"sphere"	56V11
	81	t-el	2.00	3	"sphere"	56V11
	105	t-el	1.72	4	"sphere"	56V11
	140	t-el	1.70	2	"sphere"	56V11
	380	t	2.81	5		55D46
	500	t	2.85	3		55D46
	590	t	2.92	7		55D46
	630	t	2.94	7		55D46
$Pb^{(206)}$	2.45	n, 1.65n′(90°)	0.051	6	pulsed	56C31
	2.45	n, 1.01n′(90°)	0.044	6	VdG	56C31
	2.45	n, 0.72n′(90°)	0.032	5		56C31
	2.56	n, n′ + 0.53γ(95°)	0.046	7	scin γ	56D23
	2.56	n, n′ + 0.66γ(95°)	0.022	7	scin γ	56D23
	2.56	n, n′ + 0.80γ(95°)	0.112	12	scin γ	56D23
	2.56	n, n′ + 1.44γ(95°)	0.010	5	scin γ	56D23
	2.56	n, n′ + 1.73γ(95°)	0.015	6	scin γ	56D23
$Pb^{(207)}$	2.56	n, n′ + 0.57γ(95°)	0.077	14	scin γ	56D23
	2.56	n, n′ + 0.89γ(95°)	0.051	7	scin γ	56D23
Bi^{209}	2ev to 0.02	t	graph			55B115
	1 to 50kev	t	graph			56G32
	1.75 to 7	t-el	table		sphere	56B49
	2.45	n, 1.52n′(90°)	0.030	3	pulsed	56C31
	2.45	n, 0.83n′(90°)	0.034	4	VdG	56C31
	2.56	n, n′ + 0.93γ(95°)	0.034	4	scin γ	56D23
	2.56	n, n′ + 1.62γ(95°)	0.021	2	scin γ	56D23
	3.4	el(θ)	graph		scin n	55B110
	3.5 to 14.1	t-el	table		sphere	55T26
	10	t-el	2.52		sphere	56B79
	13.0 to 16.2	t	graph			56M51
	14	el(θ)	graph		scin n	56E03
	15.9	t	5.75			56M51
Ra^{223}	th	n, γ	125	15	$11^{h}Pb$	55H71
Ac^{227}	th	a	510	36	osc	56K16
Pa^{231}	th	n, γ	200	15	$1.3^{d}Pa$	56S25
Pa^{232}	pile	n, γ	760	100	$27^{d}Pa$	56S25
Pa^{233}	pile	n, γ	140	20	ms	56H14
U	0.3 to 1.2ev	t	graph			55A51
	0.5 to 1.0	t-el	table		sphere	56B82
	1.0 to 1.8	f	graph			55S100
	380	t	3.25	6		55D46
	500	t	3.27	5		55D46
	590	t	3.29	7		55D46
	630	t	3.30	8		55D46

Neutron Cross Sections continued

Target	Neutron Energy	Type of σ	Value of σ or ∫σdΩ		Method	Ref.
U^{233}	0.002 to 1000ev	f	graph			55A51
	0.0044, 0.0118	a	table		sphere	56M40
	0.8 to 3.2	f	graph			56N10
	0.85	f	1.92	25		55S100
U^{234}	0.30 to 4.0	f	graph			55L50
U^{235}	0.004 to 200ev	f	graph			55A51
	0.005 to 150ev	f(rel)	graph			55P48
	4.4 to 49kev	a	graph		sphere	56M53
	0.4 to 1.6	f	graph			53D41
	0.70 to 1.0	f	1.15	15		55S100
	1.25	f	1.27	4		53D41
U^{236}	0.67 to 4.0	f	graph			55L50
U^{238}	29 to 840kev	n, γ	table		$23.5^{m}U$	55R55
	2.45	n, 1.27n′(90°)	0.010	3	pulsed VdG	56C31
Np^{237}	th	n, γ	172	7	$90^{y}Pu$	56B28
Np^{239}	pile	n, γ	80	15	ms	56H31
	pile	n, γ	17	$^{+17}_{-6}$	$1^{h}Np$	56L01
	pile	n, γ	29	6	$7.3^{m}Np$	56L01
Pu^{238}	th	n, γ	454	8	ms	56B26
	pile	n, γ	484	7	ms	56B26
Pu^{239}	10^{-3} to 100ev	f	graph			55A51
	0.007 to 700ev	f(rel)	graph			56R12
	0.01 to 2ev	t	graph			55G63
	0.0253ev	t	1050	13		55A47
	0.0253ev	t	1015	30		56P10
	pile	n, γ	400	40	ms	56H31
	4.4 to 49kev	a	graph		sphere	56M53
	0.05 to 2.0	f	graph			55S100
	0.8 to 3.2	f	graph			56N10
Pu^{240}	th	f	4.4	5		56H37
	pile	n, γ	530	50	ms	56F05
Pu^{241}	0.01 to 8ev	f(rel)	graph			56R12
	th	a	1450	250	ms	56F05
	th	f	1060	210		56F05
Pu^{242}	th	n, γ	22.9	8	$Am^{243}\alpha$	56B26
	pile	n, γ	50.6	7	$Am^{243}\alpha$	56B26
	pile	t	64	15	ms	56B26
	pile	n, γ	30	10	ms	56F05
Pu^{243}	pile	n, γ	170	90	ms	56F05
Pu^{244}	pile	n, γ	1.5	3	$10^{h}Pu$	56F05
	pile	n, γ	2.1	3	$2.0^{h}Am$	56B92
	pile	n, γ	1.4		$2.0^{h}Am$	55F37
Pu^{245}	pile	n, γ	260	145	$25^{m}Am$	56F05
Am^{243}	th	n, γ	81.6	18	$Cm^{244}\alpha$	56B26
	pile	n, γ	131.8	17	$Cm^{244}\alpha$	56B26
Cm^{245}	th	f	1800	300		56F11
E^{253}	pile	n, γ	450		$3.2^{h}Fm$	56J09

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3. GROUND STATE Q'S

Q values are defined by the conservation equation, $M_1 + M_2 = M_3 + M_4 + Q$ or $Q = E_3 + E_4 - E_1 - E_2$, where the M's are the rest masses and the E's the kinetic energies of the reacting particles. Ground state Q's are those measured when the product particles are left in their lowest energy states. If the most energetic emitted particle has escaped detection, the true ground state Q is greater than the value given.

The energy standard used, when clearly stated by the experimenter, is mentioned with the reference. Usually the energy measurement for only one particle, either the incident or emitted light particle, presents difficulties. It is the standard used for this particle that is given.

N. B. A uniform policy for denoting the use of enriched or monoisotopic material is now in use in all New Nuclear Data tables. This policy is described in the section on Conventions just following the Introduction. Briefly, parentheses around the A value indicate natural material, no parentheses enriched or monoisotopic material.

Reaction	Value		Source	Detector	Ref.
$Li^{6}(p,\gamma)Be^{7}$	5.66	5	VdG	scin	56W03
$Li^{(7)}(d,p)Li^{(8)}$	−0.183	20		s	55K41
$Li^{(7)}(d,\alpha)He^{(5)}$	13.719	20		s	55K41
$Li^{(7)}(t,\alpha)He^{(6)}$	9.79	14	VdG	ppl	56B106
$Li^{7}(\alpha,n)B^{10}$	−2.82	10	cyc	BF_3pc	56R06
$Li^{(7)}(\alpha,n)B^{(10)}$	−2.79		VdG	thresh n	56B23
$Li^{7}(Li^{7},p)B^{13}$	5.97	3	VdG	scin a	56A14
$Be^{8} \rightarrow 2He^{4}$	0.091		B^{12}	s	56F10
$Be^{9}(p,n)B^{9}$	−1.853	3	VdG	thresh n	55M84
$B^{10}(p,\gamma)C^{11}$	8.81	10	VdG	scin	56C20
$B^{(10)}(d,t)B^{(9)}$	−2.187	10	VdG	s	56B52
$B^{10}(\alpha,p)C^{13}$	4.08	3	cyc	scin	56P06
$B^{10}(\alpha,p)C^{13}$	4.064	12	VdG		55F15
$B^{10}(\alpha,d)C^{12}$	1.341	2	VdG	EA	55C45
$B^{10}(\alpha,d)C^{12}$	1.36	9	cyc	scin	56P06
$B^{(11)}(p,n)C^{(11)}$	−2.83	$^{+8}_{-5}$	VdG	ppl	56A22
$B^{(11)}(\alpha,n)N^{(14)}$	0.0	3	cyc	p recoil	56Q01
$B^{11}(\alpha,p)C^{14}$	0.788	17	VdG		55F15
$C^{(12)}(t,p)C^{(14)}$	4.64	4	VdG	ppl	56B106
$C^{(12)}(He^{3},n)O^{(14)}$	1.148	4	VdG	BF_3	56B22
$C^{(12)}(He^{3},n)O^{(14)}$	1.148	3	VdG		56B37
$C^{(12)}(He^{3},p)N^{(14)}$	4.77		VdG	ppl	56J02
$C^{14}(d,p)C^{15}$	−1.007	1	VdG	EA	55D34
$C^{14}(d,\alpha)B^{12}$	0.362	2	VdG	EA	55D34
$N^{(14)}(n,\gamma)N^{(15)}$	10.833	8	pile	sπ pr	56C04
$N^{(14)}(d,n)O^{(15)}$	5.21	7	VdG	ppl	56N04
$N^{(14)}(\alpha,n)F^{(17)}$	−4.76	7	cyc	$66^{s}F$	56D47
$O^{(16)}(d,n)F^{(17)}$	−1.626	4	VdG	thresh n	55M85
$O^{(16)}(d,\alpha)N^{(14)}$	3.108		VdG		55B147
$O^{(16)}(t,\alpha)N^{(15)}$	7.65	5	VdG	ppl	56B106
$O^{18}(p,n)F^{18}$	−2.447	10	VdG	BF_3	56M18
$O^{18}(d,\alpha)N^{16}$	4.237	9	CcW	sd	55P50

Reaction	Value		Source	Detector	Ref.
$F^{19}(n,\gamma)F^{20}$	6.599	11	pile	sπ pr	56C04
$F^{19}(n,d)O^{18}$	−5.79	8	(d,t)	pc	55R40
$F^{19}(p,n)Ne^{19}$	−4.022	5	VdG	thresh n	55M84
$F^{19}(d,p)F^{20}$	4.38	3	cyc	s	56E09
$F^{19}(t,\alpha)O^{18}$	11.847		VdG	sd	56J01
$F^{19}(\alpha,n)Na^{22}$	− 2.052	6	VdG	thresh	56B51
$F^{19}(\alpha,n)Na^{22}$	−2.0	2	cyc	p recoil	56Q01
$F^{19}(\alpha,p)Ne^{22}$	1.673	11	VdG		55F15
$Na^{23}(\gamma,n)Na^{22}$	−12.46	8	βtron		56C48
$Na^{23}(\alpha,n)Al^{26}$	−2.970	6	VdG	thresh	56B51
$Na^{23}(\alpha,n)Al^{26}$	−2.9	2	cyc	p recoil	56D47
$Mg^{24}(\alpha,p)Al^{27}$	−1.63	7	cyc	pc	56G28
$Mg^{25}(p,\alpha)Na^{22}$	−3.15		VdG		55B147
$Mg^{(25)}(n,\gamma)Mg^{(26)}$	11.086	25	pile	sπ pr	56C04
$Mg^{25}(\alpha,p)Al^{28}$	−1.29		cyc	pc	56G28
$Mg^{26}(\alpha,p)Al^{29}$	−2.90		cyc	pc	56G28
$Al^{27}(\gamma,n)Al^{26}$	−12.93	8	βtron		56C48
$Al^{27}(p,n)Si^{27}$	−5.607	8	VdG	thresh n	55M84
$Al^{27}(d,p)Al^{28}$	5.502	10	VdG	s	56B13
$Al^{27}(\alpha,n)P^{30}$	−2.968	6	VdG	thresh	56B51
$Al^{27}(\alpha,p)Si^{30}$	2.38	3	cyc	ppl	56H34
$Si^{(28)}(d,p)Si^{(29)}$	6.229	40		s	54K47
$P^{31}(\gamma,n)P^{30}$	−12.45	8	βtron		56C48
$P^{31}(p,\alpha)Si^{28}$	1.911	5	VdG	sd	56V14
$P^{31}(\alpha,n)Cl^{34}$	−5.7	2	cyc	thresh n	56Q01
$P^{31}(\alpha,p)S^{34}$	0.7	1	cyc	scin	56S81
$S^{(32)}(d,\alpha)P^{(30)}$	4.831	13	VdG	s	56L14
$Cl^{(35)}(\gamma,n)Cl^{(34)}$	−12.35	3.5	βtron	$32^{m}Cl$	54S107
$Cl^{(35)}(p,\alpha)S^{(32)}$	1.851	7	VdG	sd	55V14
$Cl^{(35)}(p,\alpha)S^{(32)}$	1.865	15	VdG	sπ	55A50
$Cl^{(35)}(p,\alpha)S^{(32)}$	1.863	8	VdG	s	56E12

Ground State Q's continued

Reaction	Value		Source	Detector	Ref.
$Cl^{(35)}(d,p)Cl^{(36)}$	6.354	8	VdG	s	55P46
$Cl^{(35)}(d,\alpha)S^{(33)}$	8.277	10	VdG	s	55P46
$Cl^{(37)}(p,\alpha)S^{(34)}$	3.015	15	VdG	sπ	55A50
$Cl^{(37)}(p,\alpha)S^{(34)}$	3.015	11	VdG	sd	55V14
$Cl^{(37)}(p,\alpha)S^{(34)}$	3.026	8	VdG	s	56E12
$Cl^{(37)}(d,p)Cl^{(38)}$	3.877	8	VdG	s	55P46
$Cl^{(37)}(d,\alpha)S^{(35)}$	7.783	12	VdG	s	55P46
$A^{36}(\alpha,p)K^{39}$	−1.28	3	cyc	ppl	56S20
$A^{40}(\alpha,p)K^{43}$	−3.36	3	cyc	ppl	56S20
$K^{(39)}(n,\alpha)Cl^{(36)}$	1.25	20	VdG	scin	56S57
$K^{(39)}(p,\alpha)A^{(36)}$	1.267	20	VdG	sπ	55A50
$K^{(41)}(p,\alpha)A^{(38)}$	4.002	15	VdG	sπ	55A50
$Ca^{(40)}(d,p)Ca^{(41)}$	6.140	9	VdG	sπ	56B109
$Ca^{40}(d,\alpha)K^{38}$	4.650	10	VdG	s	56B108
$Ca^{42}(p,\alpha)K^{39}$	0.118	7	VdG	s	56B108
$Ca^{42}(d,p)Ca^{43}$	5.711	10	VdG	s	56B108
$Ca^{43}(p,\alpha)K^{40}$	−0.014	8	VdG	s	56B108
$Ca^{43}(d,p)Ca^{44}$	8.913	14	VdG	s	56B108
$Ca^{44}(p,\alpha)K^{41}$	−1.057	10	VdG	s	56B108
$Ca^{44}(d,p)Ca^{45}$	5.188	10	VdG	s	56B108
$Ca^{48}(d,p)Ca^{49}$	3.916	6	VdG	s	56B108
$Sc^{45}(p,n)Ti^{45}$	−2.844	4	VdG	thresh n	55B116
$V^{(51)}(\gamma,n)V^{(50)}$	−11.09	11	βtron		56C48
$V^{(51)}(p,n)Cr^{(51)}$	−1.5355	15	VdG	BF_3	55G54
$V^{(51)}(p,n)Cr^{(51)}$	−1.535		VdG	n res	55M81
$V^{(51)}(p,\alpha)Ti^{(48)}$	1.161	10	VdG	s	55B127
$Cr^{52}(d,p)Cr^{53}$	5.74		cyc	pc	56E07
$Cr^{53}(d,p)Cr^{54}$	7.55		cyc	pc	56E07
$Mn^{55}(\gamma,n)Mn^{54}$	−10.13	7	βtron		56C48
$Mn^{55}(p,n)Fe^{55}$	−1.015	3	VdG	thresh n	56J12
$Fe^{54}(d,p)Fe^{55}$	7.073		VdG	s	56S31
$Fe^{56}(d,p)Fe^{57}$	5.418		VdG	s	56S31
$Fe^{57}(d,p)Fe^{58}$	7.808		VdG	s	56S31
$Fe^{58}(d,p)Fe^{59}$	4.350		VdG	s	56S31
$Co^{59}(\gamma,n)Co^{58}$	−10.39	6	βtron		56C48
$Ni^{58}(p,\gamma)Cu^{59}$	3.43	2	VdG	scin	56G03
$Ni^{60}(p,\gamma)Cu^{61}$	4.88		VdG	scin	56G03
$Cu^{(63)}(\gamma,n)Cu^{(62)}$	−10.80	5	βtron	10^mCu	56B47
$Cu^{(63)}(\gamma,n)Cu^{(62)}$	−10.73	3	βtron		56R38
$Cu^{63}(p,n)Zn^{63}$	−4.149	4	VdG	thresh n	55B116

Ground State Q's continued

Reaction	Value		Source	Detector	Ref.
$Cu^{(65)}(\gamma,n)Cu^{(64)}$	−9.91	11	βtron	13^hCu	56B47
$Cu^{65}(p,n)Zn^{65}$	−2.136	4	VdG	thresh n	55B116
$Cu^{65}(p,n)Zn^{65}$	−2.131	5	VdG	n res	55M81
$Zn^{(68)}(p,n)Ga^{(68)}$	−3.694	6	VdG	thresh n	55B116
$As^{75}(\gamma,n)As^{74}$	−10.14	10	βtron		56C48
$Kr^{78}(d,p)Kr^{79}$	5.9		cyc	ppl	56B53
$Kr^{80}(d,p)Kr^{81}$	5.1		cyc	ppl	56B53
$Sr^{86}(\gamma,n)Sr^{85}$	−11.5		βtron	BF_3	55Y08
$Y^{89}(\gamma,n)Y^{88}$	−11.72	7	βtron		56C48
$Zr^{(90)}(\gamma,n)Zr^{(89)}$	−11.78	9	βtron	4^mZr	56A08
$Nb^{93}(\gamma,n)Nb^{92}$	−8.72	6	βtron		56C48
$Rh^{103}(\gamma,n)Rh^{102}$	−9.39	10	βtron		56C48
$Ag^{(107)}(\gamma,n)Ag^{(106)}$	−9.46	5	βtron	24^mAg	56B47
$Ag^{(109)}(\gamma,n)Ag^{(108)}$	−9.18	5	βtron	2.3^mAg	56B47
$I^{127}(\gamma,n)I^{126}$	−9.11	6	βtron		56C48
$Cs^{133}(\gamma,n)Cs^{132}$	−9.03	6	βtron		56C48
$La^{(139)}(\gamma,n)La^{(138)}$	−8.89	6	βtron		56C48
$Pr^{141}(\gamma,n)Pr^{140}$	−9.42	6	βtron		56C48
$Sm^{(142)}(\gamma,n)Sm^{(143)}$	−9.6		βtron	9^mSm	56S66
$Sm^{(149)}(n,\gamma)Sm^{(150)}$	8.00	3	pile	sπ Cp	55A46
$Tb^{159}(\gamma,n)Tb^{158}$	−8.03	6	βtron		56C48
$Ho^{165}(\gamma,n)Ho^{164}$	−8.14	6	βtron		56C48
$Tm^{169}(\gamma,n)Tm^{168}$	−7.93	6	βtron		56C48
$Ta^{181}(\gamma,n)Ta^{180}$	−7.69	6	βtron		56C48
$Au^{197}(\gamma,n)Au^{196}$	−8.01	6	βtron		56C48
$Hg^{(199)}(n,\gamma)Hg^{(200)}$	8.03	3	pile	sπ Cp	55A46
$Bi^{209}(\gamma,n)Bi^{208}$	−7.40	5	βtron		56C48
$Bi^{209}(p,2n)Po^{208}$	−9.65	8	cyc	α Po^{208}	56A05

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4. MASS DIFFERENCES

Where no superscripts have been used with H, C, and O, the weights of the most abundant isotopes, namely 1, 12 and 16 respectively, are to be understood. Differences are given in millimass units.

	Value		Ref.
$C_4H_8O_2 - C_4H_7O_2$	+1008.16	2	56S45
$H^2 - H_2$	−1.5483	10	56D34
$N^{14}H^2H - N^{14}H_3$	−1.5478	4	56Q02
$H^2O - H_2O$	−1.5476	5	56Q02
$H_2^2 - He^4$	+25.600	2	56D34
$2H_3^2 - C$	+84.596	14	56D34
$H_2^2O - H_2O^{18}$	+8.3102	4	56Q02, 56S45
$HH^2O - F^{19}$	+18.4380	14	56S45
$H_2^2O - HF^{19}$	+16.8944	5	56S45
$H_2^2O - Ne^{20}$	+30.6872	7	56Q02, 56S45
$HH^2O^{18} - Ne^{21}$	+27.2482	7	56S45
$2H_2^2O - A^{40}$	+83.8780	20	56Q02
$He^4 - H_2^2$	−25.600	2	56D34
$B^{10}F_2^{19} - S^{32}O$	+42.7730	17	56S45
$B^{10}H - B^{11}$	+11.450	12	56L27
$B^{10}B^{11}H_2 - Na^{23}$	+48.130	10	56L27
$B^{11}H - C$	+17.139	7	56L27
$B^{11}F_3^{19} - C_4H_4O$	−21.7052	13	56S45
$CH_4 - O$	+36.3931	9	56Q02
	+36.388	4	56D34
$C_2H_4 - CO$	+36.3934	8	56Q02
$C_3H_8 - CO_2$	+72.7870	16	56Q02
$C^{13} - C$	+1003.680	20	56R03
$C^{13}H_4 - HO$	+31.943	11	56K14
	+31.9253	7	56S45
$N^{14} - CH_2$	−12.5803	4	56Q02, 56S45
$N^{14}H_2 - CH_4$	−12.5803	4	56Q02, 56S45
$N_2^{14} - C_2H_4$	−25.1585	6	56Q02, 56S45
$N^{14}H_2 - O$	+23.8164	5	56Q02, 56S45
$N^{14}H_3 - HO$	+23.833	8	56K14
	+23.8159	6	56Q02, 56S45
$N_2^{14} - CO$	+11.2441	19	56M23, 55008
	+11.2353	7	56Q02
	+11.2355	6	56S45
$N^{15} - CH_3$	−23.3652	9	56S45
$N^{15}H_3 - H_2O$	+13.019	5	56K14
	+13.0234	4	56S45
$2O^{17}O - C_4H_2O$	−22.448	18	56K14
$O^{17} - HO$	−3.6077	5	56S45
$H_2O^{17} - H_3O$	−3.601	6	56K14
$O^{18} - O$	+2004.875	25	56R03
$O^{18} - H_2O$	−11.4033	21	56Q02, 56S45
$HO^{18} - H_3O$	−11.405	8	56K14
$H_2O^{18} - H_2^2O$	−8.3102	4	56Q02, 56S45
$2O^{18}O - C_4H_4O$	−38.080	26	56K14
	−38.0734	16	56Q02, 56S45
$H_2O^{18} - HF^{19}$	+8.582	2	56K14
$H_2O^{18} - Ne^{20}$	+22.392	5	56K14
	+22.3770	6	56Q02, 56S45
$HH^2O^{18} - Ne^{21}$	+27.2482	7	56S45
$COO^{18} - 2Na^{23}$	+14.5184	40	56S45
$CF_3^{19} - C_5H_9$	−75.2462	20	56S45
$Si^{28}F_3^{19} - C_6H_{13}$	−129.625	4	56S45
$Si^{29}F_3^{19} - C_6H_{14}$	−137.889	7	56S45
$F^{19} - HH^2O$	−18.4380	14	56S45
$HF^{19} - H_2^2O$	−16.8944	5	56S45
$B^{11}F_3^{19} - C_4H_4O$	−21.7052	13	56S45
$Si^{30}F_3^{19} - C_4H_7O_2$	−75.6590	36	56S45
$HF^{19} - H_2O^{18}$	−8.582	2	56K14
$B^{10}F_2^{19} - S^{32}O$	+42.7730	17	56S45
$Ne^{20} - H_2^2O$	−30.6872	7	56Q02, 56S45
$Ne^{20} - H_2O^{18}$	−22.392	5	56K14
	−22.3770	6	56Q02, 56S45
$2Ne^{21} - C_2H_2O$	−22.858	10	56K14
$Ne^{21} - HH^2O^{18}$	−27.2482	7	56S45
$2Ne^{22} - CO_2$	−7.042	24	56K14
	−7.0614	12	56S45
$Na^{23} - B^{10}B^{11}H_2$	−48.130	10	56L27
$2Na^{23} - COO^{18}$	−14.5184	40	56S45
$Mg^{24} - C_2$	−14.9621	11	56S45
$Mg^{25} - C_2H$	−21.9944	10	56S45
$Mg^{26} - C_2H_2$	−33.0676	10	56S45
$Al^{27} - C_2H_3$	−41.9548	23	56S45
$Si^{28}F_3^{19} - C_6H_{13}$	−129.625	4	56S45
$Si^{29}F_3^{19} - C_6H_{14}$	−137.889	7	56S45
$Si^{30}F_3^{19} - C_4H_7O_2$	−75.6590	36	56S45

	Value		Ref.
$S^{32}O - C_4$	−33.0269	13	56Q02
$S^{32} - O_2$	−17.7599	9	56Q02
	−17.756	10	56S26
$2H^2S^{32} - C_4H_4O$	−50.7852	18	56Q02
$S^{32}O - B^{10}F_2^{19}$	−42.7730	17	56S45
$S^{32}O_2 - Zn^{64}$	−32.7687	32	56Q02
$S^{33} - HS^{32}$	−8.448	25	56S26
$H_2S^{34} - C_3$	−16.466	10	56S26
$S^{34} - H_2S^{32}$	−19.851	10	56S26
$A^{36} - C_3$	−32.4729	20	56Q02
$A^{36} - 2H_2O$	−53.5874	12	56Q02
$A^{40} - C_3H_4$	−68.9344	13	56Q02
$A^{40} - 2H_2^2O$	−83.8780	26	56Q02
$K^{39} - C_3H_3$	−59.762	20	56L27
$K^{41} - C_3H_5$	−77.331	20	56L27
$Ni^{58} - C_3H_6O$	−106.52	15	56E10
	−107.0*	2	56I03
$Ni^{60} - C_2H_4O_2$	−90.82	15	56E10
$Zn^{64} - 2O_2$	−50.90	30	55K42
	−50.5266	52	56Q02
$Zn^{64} - S^{32}O_2$	−32.7687	32	56Q02
$2Zn^{66} - Xe^{132}$	−51.22	30	55K42
	−51.0*	4	56I03
$2Zn^{67} - Xe^{134}$	−50.50	40	55K42
$2Zn^{68} - Xe^{136}$	−54.40	40	55K42
$Xe^{132} - 2Zn^{66}$	+51.22	30	55K42
	+51.0*	4	56I03
$Xe^{134} - 2Zn^{67}$	+50.50	40	55K42
$Xe^{136} - 2Zn^{68}$	+54.40	40	55K42

*Dependence on gas pressure in spectrograph studied. Values listed here are for lowest pressure.

Some recent mass spectrometer masses compared with masses calculated from Q values by Wapstra (55W47)

	Value		Ref.
H^1	1.0081442	2 mass units	56Q02
	1.0081459	5	54M37
	1.008142	1	56D34
	1.0081452	15	55W47
H^2	2.0147406	6	56Q02
	2.0147444	9	54M37
	2.014736	2	56D34
	2.0147403	28	55W47
He^4	4.0038797	16	54M37
	4.003872	4	56D34
	4.0038739	26	55W47
C^{12}	12.0038167	8	56Q02
	12.0038231	33	54M37
	12.003820	5	56D34
	12.003803	5	55W47
S^{32}	31.9822401	9	56Q02
	31.982196	26	55W47

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5. NUCLEAR SPINS AND MOMENTS

Listed here in tabular form are the nuclear spins and moments which are also reported, often in a more detailed manner, in Table 1. Spins, J, are given in units of $h/2\pi$; magnetic dipole moments, μ, in nuclear magnetons; electric quadrupole moments, q, in barns; magnetic octopole moments, μ_3, in nuclear magneton barns; electric 16-pole moments, q_4, in 10^{-48} cm^4.

Magnetic moments are reported without diamagnetic correction and where relative measurements have been made are based on $\mu(H) = +2.79267$ and the substandards listed by H. Walchli, ORNL-1469. The spins and moments are those for the ground states of the nuclei unless the particular level is specified. When the sign of the moment cannot be determined by the experimental method used, measured values are given between absolute value signs, e.g. $|1.1774\ 2|$.

ABBREVIATIONS

calc	value obtained from reevaluation of old data
$\gamma(\theta,T)$	γ intensity as function of angle and temperature
$\gamma\gamma(\theta,H)$	$\gamma\gamma$ coincidences as a function of angle and magnetic field
I	nuclear induction, magnetic resonance
M	molecular or atomic beam resonance
Mic	microwave
para	paramagnetic resonance
$p\gamma(\theta,H)$	$p\gamma$ coincidences as a function of angle and magnetic field
q res	quadrupole resonance
S	atomic spectra

	J	μ	q	Method	Ref.
n^1		−1.913138 45		M	56C02
H^1		+2.79268 10		deceler.cyc	56T19
Be^9	3/2	|1.1774 2|		I	56B48
F^{19} (0.197 level)		+3.0 7		$\gamma\gamma(\theta,H)$	56S78
		+3.50 24		$\gamma\gamma(\theta,H)$	56P30
		+3.70 45		$p,\gamma(\theta,H)$	56L22
		+3.4 9		$\gamma\gamma(\theta,H)$	55T25
Al^{27}	5/2	|3.6385 3|		I	56B48
V^{51}			+0.28 15	S	56M36
Co^{56}	4	|3.848 15|		para	56B69
	4	|3.855 7|		para	56J06
		|2.6 2|		$\gamma(\theta,T)$	56S13
Co^{57}	7/2	|4.65 5|		para	56B69
Co^{60}		positive		see ref.	55W42
	5	|3.800 7|		para	56D46
As^{75}		+1.45 15	+0.32 5	S	52M64
Kr^{83}	9/2		+0.22 2	S	55R46
Rb^{81} (31^m level)					
	9/2			M	56S70
Rb^{81}	3/2			M	56S71
Rb^{82} (0.24 level)					
	5			M	56S71
Rb^{83}	5/2			M	56S71
Rb^{84}	2			M	56S71
Rb^{85}			+0.27 2	M	56S59
Rb^{87}			+0.14 6	S	56K16
			+0.13 1	M	56S59
Zr^{91}		−1.9 2		S	55M88
Mo^{95}	5/2			para	56O04
	7/2			S	55M88
Mo^{97}	5/2			para	56O04
	7/2			S	55M88
Ru^{99}	5/2	−0.63 15		S	55M78
Ru^{101}	5/2	−0.69 15		S	55M78
Cd^{111} (0.247 level)					
		−0.783 23		$\gamma\gamma(\theta,H)$	56S63
In^{114}	5	+4.7 5		M	55G46
In^{115}		$\|\mu_3\| = 0.31$ 1		calc M	55S89
In^{116} (54^m level)					
	5	+4.21 8		M	56N12
	5	+4.4 4		M	55G56
I^{127}		$\|\mu_3\| = 0.17$ 3		calc M	55S89
Ba^{135}		+0.832293 25		I	56W20
Ba^{137}		+0.931074 55		I	56W20
La^{139}			+0.3 1	S	55L59
			+0.6 2	S	55M79
Pr^{141}	5/2	|3.9 2|		para	55B108
		+4.0 1	0.0 2	S	54M100
Nd^{147}	9/2	|0.22 5|		$\gamma(\theta,T)$	56A04
Sm^{147}		|0.83 15|	|<0.72|	calc para	53E19
Sm^{149}		|0.68 10|	|<0.72|	calc para	53E19
Gd^{155}	3/2	−0.30 4	+1.1 3	S	56S21
Gd^{157}	3/2	−0.37 4	+1.0 3	S	56S21
Dy^{161}	5/2	|0.38 5|		para	56C21
	3/2	$\mu^{163}/\mu^{161} = 1.07$ 5		S	56M41
		$q^{163}/q^{161} \sim 1$		S	56M41
Dy^{163}	5/2	|0.53 5|		para	56C21
	3/2			S	56M41
Ho^{165}	7/2	|3.29 17|	|~2|	para	55B104
		μ and q have same sign			55B104

	J	μ	q	Method	Ref.
Er^{167}		|0.50 12|	| 10 2|	calc para	53E19
Tm^{169}	1/2	−0.205 20		S	55L49
Yb^{171}	1/2	|0.43 5|		para	56C21
		+0.49 6		S	55K33
Yb^{173}	5/2	|0.60 5|		para	56C21
	5/2	−0.67 1		S	55K33
Hf^{177}	7/2	+0.61 3	+3 1	S	56S53
Hf^{179}	9/2	−0.47 3	+3 1	S	56S53
Ta^{181} (0.480 level)					
	5/2	+3.25 17	$\gamma\gamma(\theta)$; $\gamma\gamma(\theta,H)$		55H69
Au^{198}	2	|0.50 4|		M	56C08
Au^{199}	3/2	|0.24 2|		M	56C08
Hg^{199} (0.159 level)			|0.70 $^{+40}_{-15}$|	$\gamma\gamma(\theta)$	56P14
Po^{209}	1/2			S	56V16
U^{233}	5/2	$\mu^{233}/\mu^{235} \sim -1.5$		S	55K36
	5/2	$\mu^{233}/\mu^{235} = -1.8$ 1		S	55K40
			$q^{233}/q^{235} = +2.0$ 3	S	55K40
U^{235}	5/2(7/2?)			S	55K40
	7/2	|0.38 or 0.31|		para	56H26
Pu^{239}	1/2			S	55K36
	1/2			S	55K40
Am^{241}		+1.4	+4.9	S	56M31
	5/2		large	S	56T18
Am^{243}		+1.4	+4.9	S	56M31

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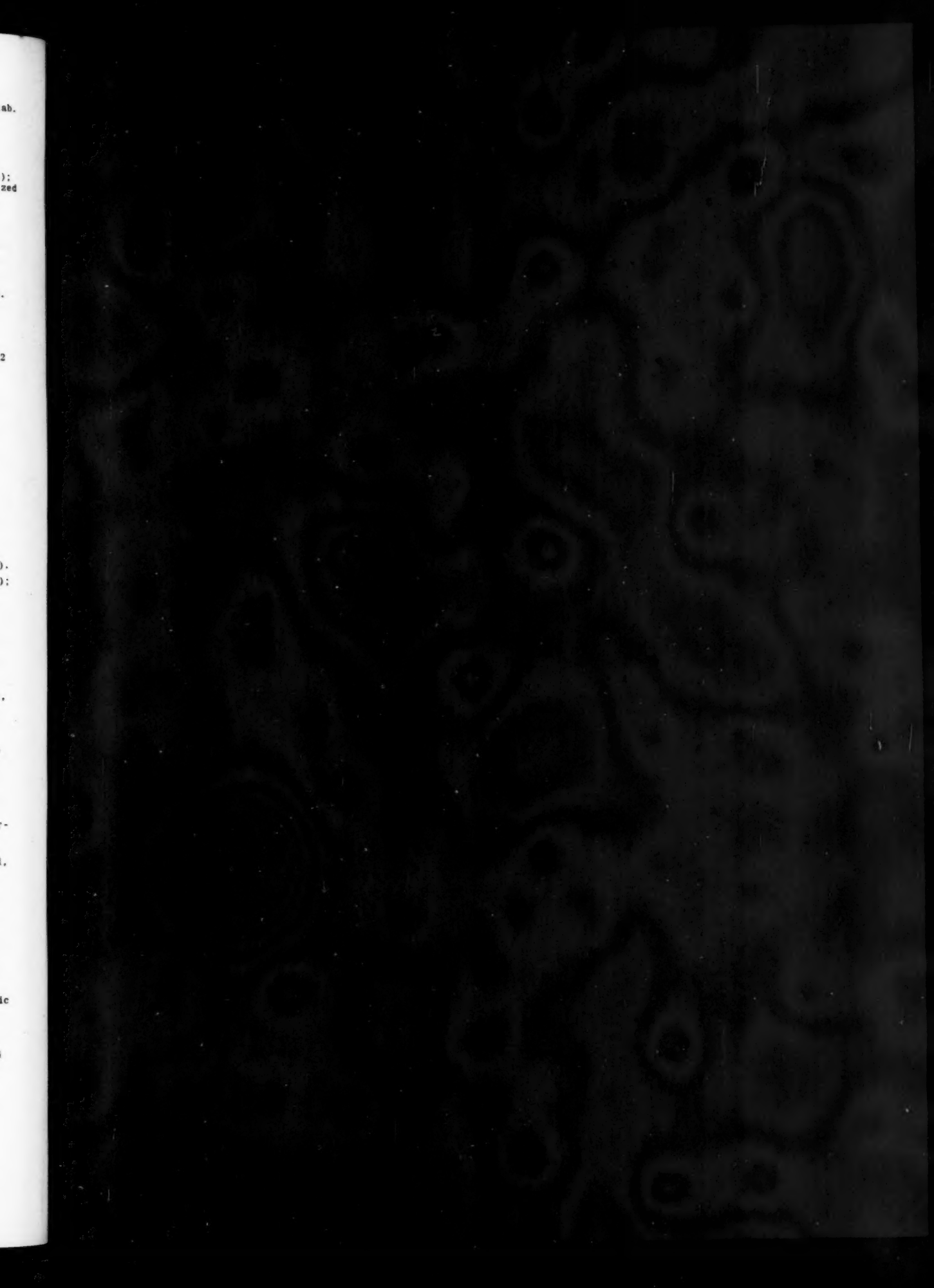

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